

김현승 (한국학중앙연구원 디지털인문학연구소)

Protege™



1

프로테제 다운로드 및 실행



누가(who)



무엇을(what)



어떻게(how)



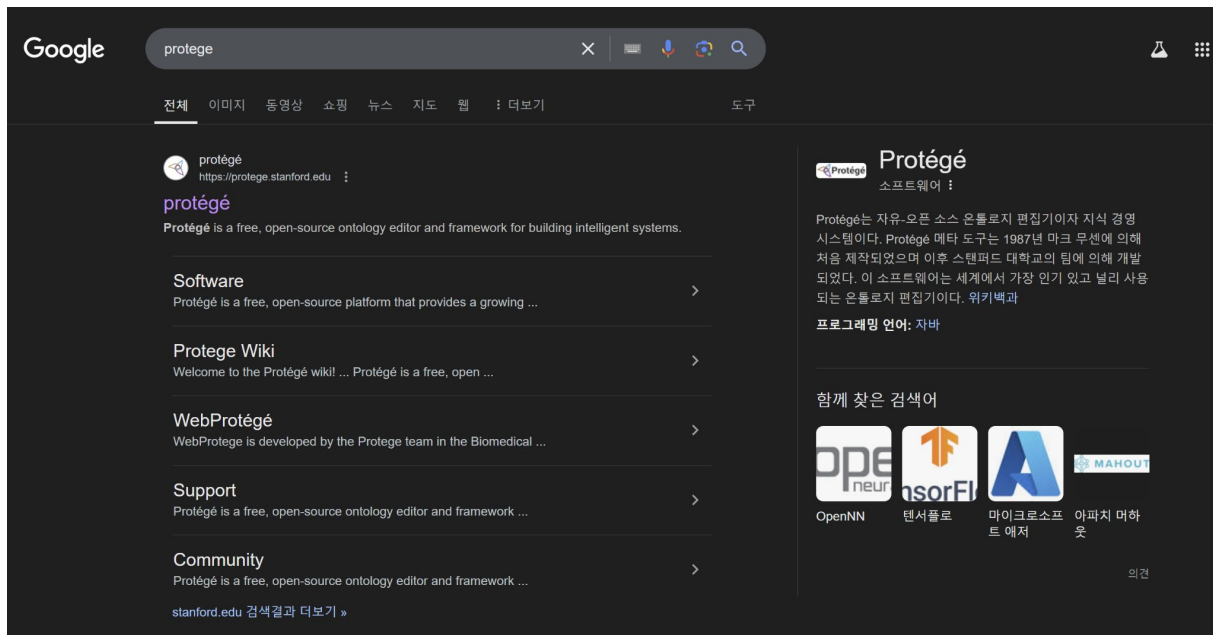
언제(when)



어디에서(where)

프로테제 다운로드

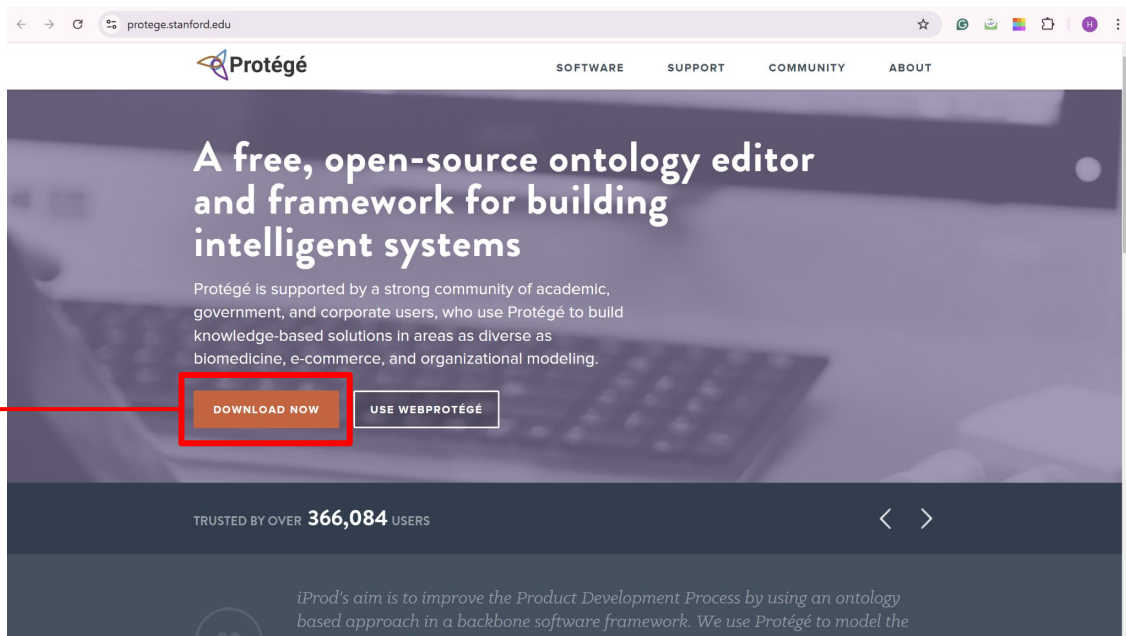
❖ 인터넷 검색창에서 protege 검색 → 홈페이지 클릭



프로테제 다운로드

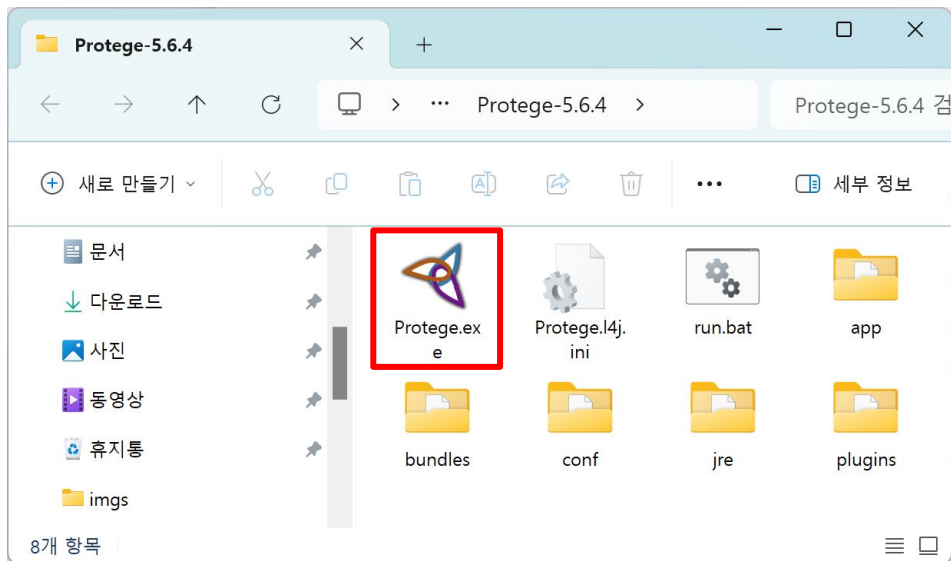
❖ DOWNLOAD NOW 버튼 클릭 → 파일 설치 및 실행

클릭



프로테제 다운로드

- ❖ 다음에 작업할 때에는 Protege 폴더에 있는 Protege.exe 파일을 실행하여 사용하면 된다.

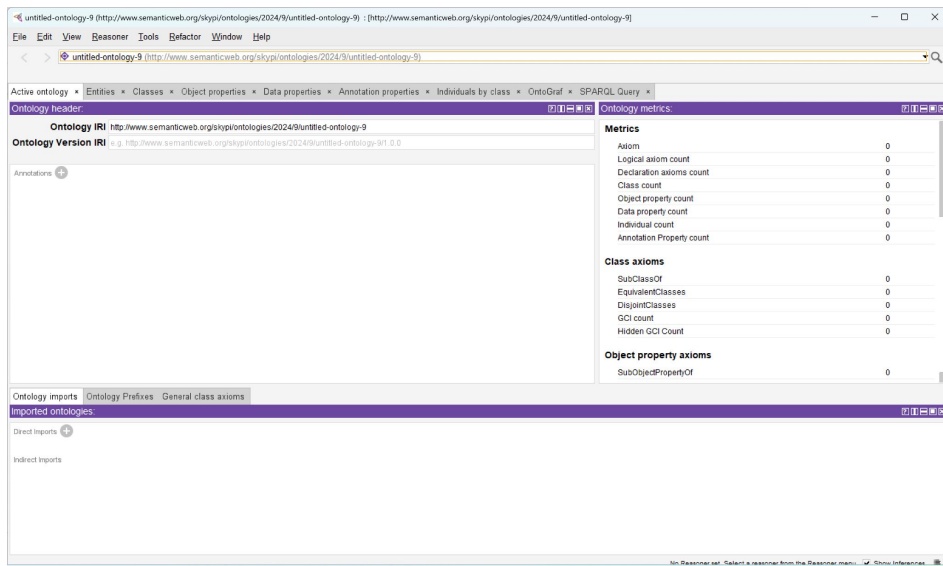


2

프로테제 화면 구성

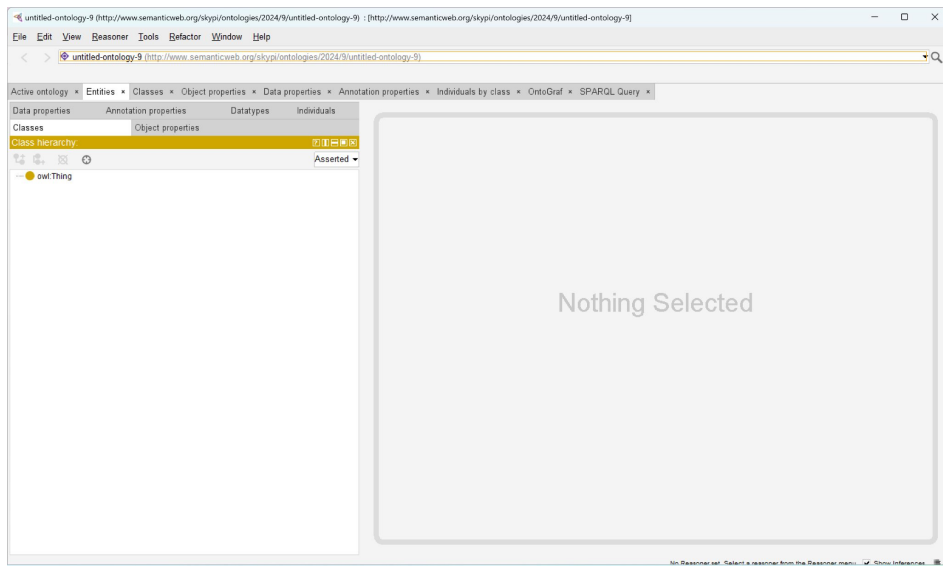
Active Ontology : 온톨로지 개괄

- ❖ 처음엔 Active Ontology 화면이 나타난다.
- ❖ 온톨로지에 대한 기본적인 설명을 작성한다.



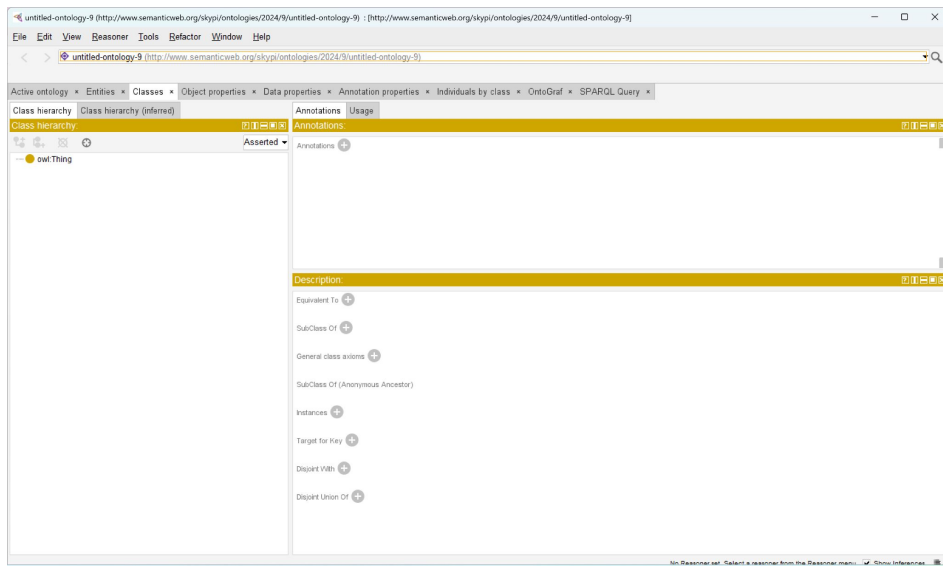
Entities : 통합 작업 환경

- ❖ 엔티티라고 하는 통합 작업 환경 창을 볼 수 있다.
- ❖ Class, Property, Relation 등 통합적으로 작업하는 곳이다.



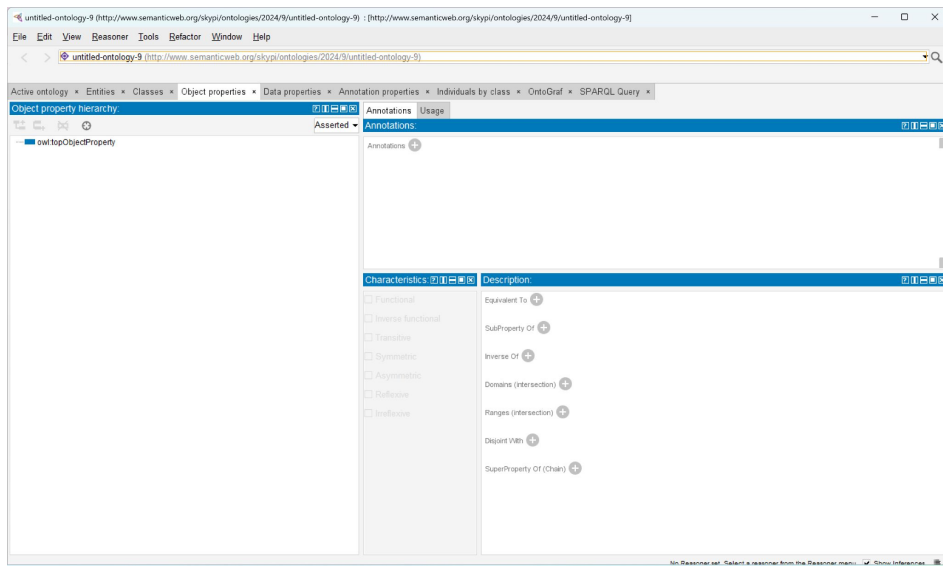
Classes : 클래스 작업 환경

- ❖ 클래스 작업을 할 수 있는 곳이다.
- ❖ 개체들의 범주를 설정해준다.



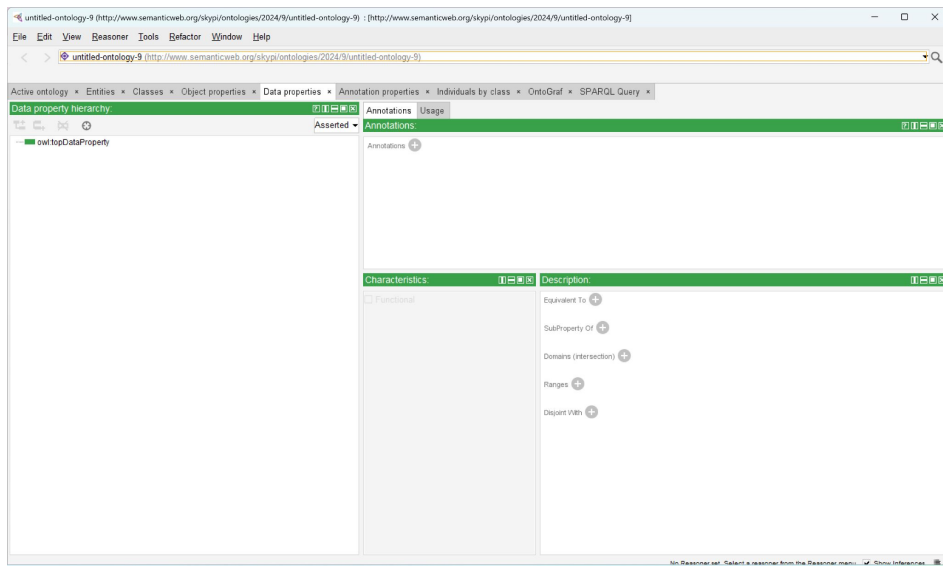
Object properties : 연결정보 작업 환경

- ❖ 오브젝트 프로퍼티 작업을 할 수 있는 곳이다.
- ❖ Domain, Range 등의 관계를 서술한다.



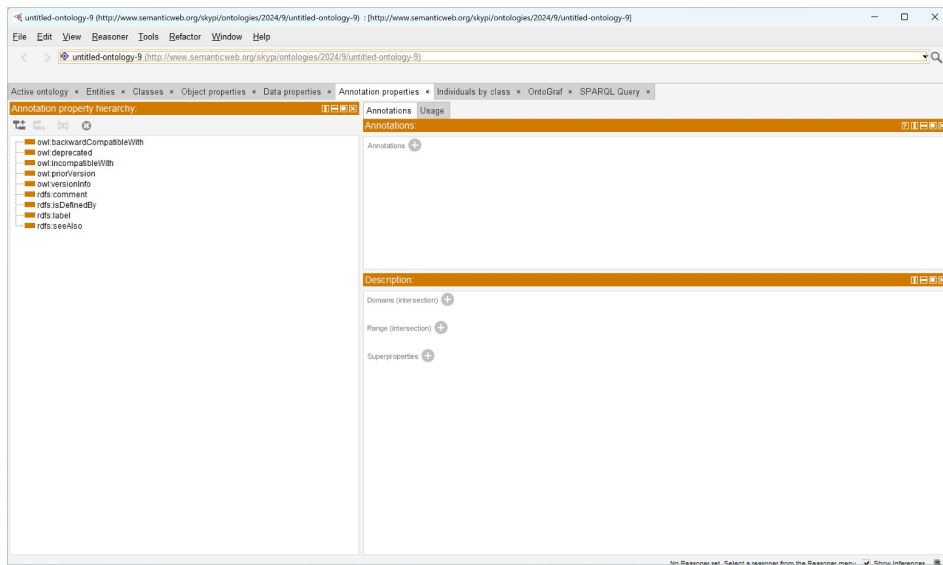
Data properties : 데이터 작업 환경

- ❖ 데이터 프로퍼티 작업을 할 수 있는 곳이다.
- ❖ 개체들의 속성을 설정한다.



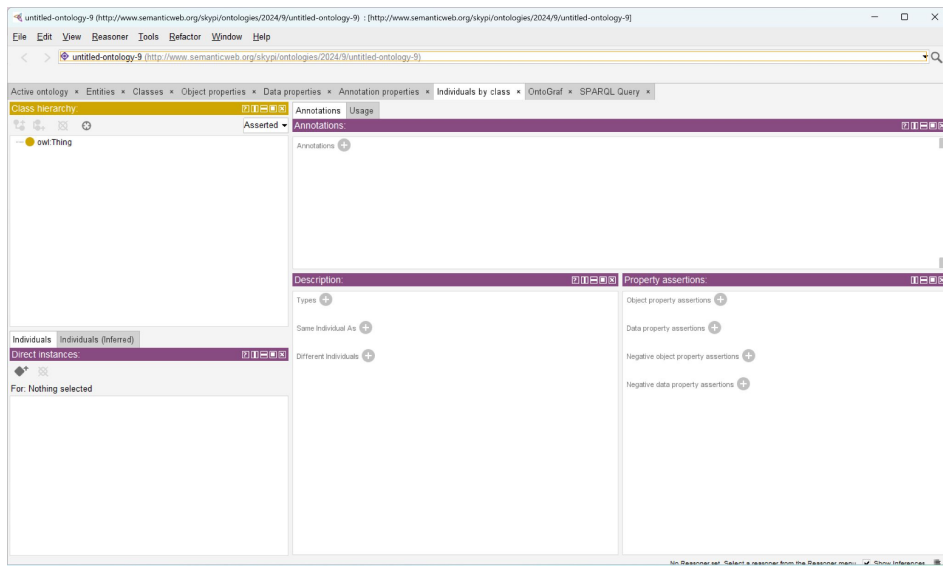
Annotation properties : 설명 정보 작업 환경

❖ 주석과 관련한 정보를 관리하는 곳이다.



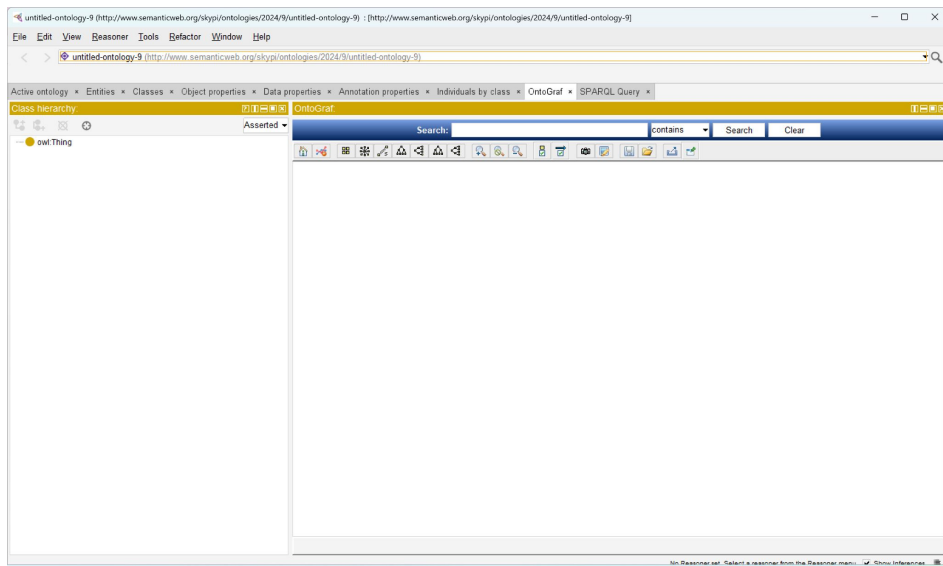
Individuals by class : 개체 작업 환경

- ❖ 정보화 하고자 하는 지식 요소들을 입력한다.



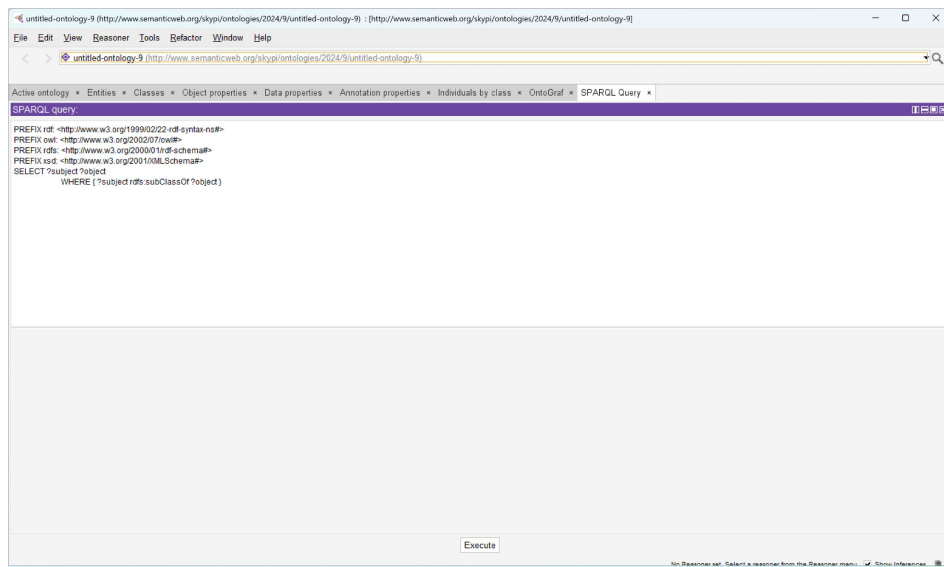
OntoGraf : 시각화

- ❖ 온톨로지 설계 내용을 시각적인 화면으로 확인할 수 있다.
- ❖ 그래프 모양을 캡처해서 논문에 사용하기도 한다.



SPARQL Query : 온톨로지를 위한 질문 방식

- ❖ SPARQL(Simple Protocol and RDF Query Language) : RDF (Resource Description Framework) 형식의 데이터를 탐색할 수 있는 데이터베이스 질의어.





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프로테제 실습 - Active Ontology

Active Ontology : IRI 입력

The screenshot shows the Active Ontology web interface. A red box highlights the 'Ontology IRI' field, which contains the URL 'http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9'. A red line connects this field to a text box that says 'IRI : 온톨로지 주소'. Another red line connects the same field to a blue box containing '▼ 권장하는 IRI 주소' and 'http://dh.aks.ac.kr/ontologies/khs'. A yellow box highlights the 'khs' part of the URL, with a yellow line connecting it to a text box that says '본인 이름'.

untitled-ontology-9 (http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9) : [http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9]

File Edit View Reasoner Tools Refactor Window Help

untitled-ontology-9 (http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9)

Active ontology * Entities * Classes * Object properties * Data properties * Annotation properties * Individuals by class * OntoGraf * SPARQL Query *

Ontology header

Ontology IRI http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9

Ontology Version IRI e.g. http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/1.0.0

Annotations +

Metrics

Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	0

Class axioms

SubClassOf	0
	0
	0
	0
	0
	0

Ontology imports

Imported ontologies:

Direct imports +

Indirect imports

Min Reasoner set. Select a reasoner from the Reasoner menu. Show Inferences

IRI : 온톨로지 주소

▼ 권장하는 IRI 주소

http://dh.aks.ac.kr/ontologies/khs

본인 이름

Active Ontology : 수정된 IRI 확인

The screenshot displays the Active Ontology web application interface. The browser's address bar shows the URL `http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/`. The application's main header includes a menu bar with options like File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. Below the menu, the 'Ontology header' section is visible, containing the 'Ontology IRI' field, which is highlighted with a red box and contains the value `http://dh.aks.ac.kr/ontologies/khs/`. The 'Ontology Version IRI' field below it shows `http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/1.0.0`. The 'Ontology metrics' panel on the right lists various counts: Axiom (0), Logical axiom count (0), Declaration axioms count (0), Class count (0), Object property count (0), Data property count (0), Individual count (0), and Annotation Property count (0). Below this, the 'Class axioms' section lists SubClassOf (0), EquivalentClasses (0), DisjointClasses (0), GCI count (0), and Hidden GCI Count (0). The 'Object property axioms' section lists SubObjectPropertyOf (0). The 'Ontology imports' section at the bottom shows 'Imported ontologies' and 'Direct Imports' (0). The status bar at the bottom indicates 'No Reasoner set. Select a reasoner from the Reasoner menu' and 'Show Inferences'.

Active ontology × Entities × Classes × Object properties × Data properties × Annotation properties × Individuals by class × OntoGraf × SPARQL Query ×

Ontology header: **Ontology IRI** `http://dh.aks.ac.kr/ontologies/khs/`

Ontology Version IRI `http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/1.0.0`

Annotations +

Ontology metrics:

Metrics	
Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	0

Class axioms

SubClassOf	0
EquivalentClasses	0
DisjointClasses	0
GCI count	0
Hidden GCI Count	0

Object property axioms

SubObjectPropertyOf	0
---------------------	---

Ontology imports | **Ontology Prefixes** | General class axioms

Imported ontologies:

Direct Imports +

Indirect Imports

No Reasoner set. Select a reasoner from the Reasoner menu | ☒ Show Inferences

Active Ontology : Annotations 입력

1 Annotations +

2 rdfs:comment

3 Value

김현승이 2024년에 만든
디지털유산프로젝트 수업 실습
온톨로지이다.

Language Tag

xsd:string

확인 취소

Active Ontology : Annotations 입력

Active ontology: khs (http://dh.aks.ac.kr/ontologies/khs) : [http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9]

File Edit View Reasoner Tools Refactor Window Help

Active ontology: khs (http://dh.aks.ac.kr/ontologies/khs)

Ontology header

Ontology IRI: http://dh.aks.ac.kr/ontologies/khs

Ontology Version IRI: e.g. http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9

Annotations

Ontology imports: Imported ontologies

Direct Imports

Indirect Imports

Create Annotation

Literal Entity IRI IRI Editor Property values

Value

김현승이 2024년에 만든 디지털유산프로젝트 수업 실습 윤틀로지이다.

Language Tag

ko

kg (Kongo)

ko (Korean)

kv (Komi)

zh-HK (Chinese; Hong Kong)

⑤ 확인

④

No Reasoner set. Select a reasoner from the Reasoner menu. Show Inferences

Active Ontology : Annotations 입력

The screenshot displays the Active Ontology web application interface. The browser address bar shows the URL `http://dh.aks.ac.kr/ontologies/khs`. The application has a menu bar with `File`, `Edit`, `View`, `Reasoner`, `Tools`, `Refactor`, `Window`, and `Help`. Below the menu is a tab bar with `Active ontology`, `Entities`, `Classes`, `Object properties`, `Data properties`, `Annotation properties`, `Individuals by class`, `OntoGraf`, and `SPARQL Query`. The main content area is divided into two panels. The left panel, titled `Ontology header`, shows the `Ontology IRI` as `http://dh.aks.ac.kr/ontologies/khs` and the `Ontology Version IRI` as `http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/1 0.0`. Below this is the `Annotations` section, which is highlighted with a red box. It shows a single annotation: `rdfs:comment` with the value `김현승이 2024년에 만든 디지털유산프로젝트 수업 실습 문제입니다.`. The right panel, titled `Ontology metrics`, displays various counts: `Axiom` (0), `Logical axiom count` (0), `Declaration axioms count` (0), `Class count` (0), `Object property count` (0), `Data property count` (0), `Individual count` (0), and `Annotation Property count` (1). Below the metrics are sections for `Class axioms` and `Object property axioms`. The bottom of the interface shows `Ontology imports` and `Imported ontologies` sections.

Active ontology x Entities x Classes x Object properties x Data properties x Annotation properties x Individuals by class x OntoGraf x SPARQL Query x

Ontology header

Ontology IRI `http://dh.aks.ac.kr/ontologies/khs`

Ontology Version IRI `http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/1 0.0`

Annotations

`rdfs:comment` [language: ko]

김현승이 2024년에 만든 디지털유산프로젝트 수업 실습 문제입니다.

Ontology metrics

Metrics

Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	1

Class axioms

SubClassOf	0
EquivalentClasses	0
DisjointClasses	0
GCI count	0
Hidden GCI Count	0

Object property axioms

SubObjectPropertyOf	0
---------------------	---

Ontology imports

Imported ontologies:

Direct Imports

Indirect Imports

No Reasoner set. Select a reasoner from the Reasoner menu ☒ Show Inferences

Active Ontology : Ontology Prefixes 추가

The screenshot displays the Active Ontology web application interface. The browser address bar shows the URL `http://dh.aks.ac.kr/ontologies/khs`. The application has a menu bar with `File`, `Edit`, `View`, `Reasoner`, `Tools`, `Refactor`, `Window`, and `Help`. Below the menu is a tab bar with `Active ontology`, `Entities`, `Classes`, `Object properties`, `Data properties`, `Annotation properties`, `Individuals by class`, `OntoGraf`, and `SPARQL Query`. The main content area is divided into several panels:

- Ontology header:** Contains the `Ontology IRI` (`http://dh.aks.ac.kr/ontologies/khs`) and the `Ontology Version IRI` (`http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/1.0.0`).
- Annotations:** A list of annotations, including an `rdfs:comment` in Korean: "김철승이 2024년에 만든 디지털유산프로젝트 수업 실습 윤블로지이다."
- Ontology metrics:** A table showing various counts for the ontology.
- Class axioms:** A table showing counts for class-related axioms.
- Object property axioms:** A table showing counts for object property axioms.
- Ontology imports:** A list of imported ontologies.
- Ontology Prefixes:** A list of prefixes used in the ontology, including `owl:`, `rdf:`, and `www:`.

The **Ontology Prefixes** tab is highlighted with a red box. The prefixes listed are:

- `owl:` `http://www.w3.org/2002/07/owl#`
- `rdf:` `http://www.w3.org/1999/02/22-rdf-syntax-ns#`
- `rdfs:` `http://www.w3.org/2000/01/rdf-schema#`
- `www:`

At the bottom of the interface, there is a status bar with the text: "No Reasoner set. Select a reasoner from the Reasoner menu" and a checkbox for "Show Inferences".

Metric	Count
Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	1

Axiom	Count
SubClassOf	0
EquivalentClasses	0
DisjointClasses	0
GCI count	0
Hidden GCI Count	0

Axiom	Count
SubObjectPropertyOf	0

Active Ontology : Ontology Prefixes 추가 (khs)

1. Click on the 'Prefixes' button in the 'Ontology prefixes' section.

2. Prefix name: khs

Prefix names are usually short and should end with a colon.
Examples are schema:, go: and vehicle:

3. Prefix: http://dh.aks.ac.kr/ontologies/khs#

Prefixes should not contain spaces and usually end with a slash (/) or hash (#)

4. Confirm (확인) button

Cancel (취소) button

Active Ontology : Ontology Prefixes 추가 (khs)

The screenshot shows the 'Active Ontology' interface with the 'Ontology prefixes' tab selected. The 'khs:' prefix is highlighted with a red box. The interface includes a menu bar, a toolbar, and several panels for ontology management.

Ontology header:

- Ontology IRI: <http://dh.aks.ac.kr/ontologies/khs>
- Ontology Version IRI: <http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/1.0.0>

Annotations:

- rdfs:comment** [language: ko]
김철승이 2024년에 만든 디지털유산프로젝트 수업 실습 윤블로지이다.

Ontology metrics:

Metric	Count
Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	1

Class axioms:

Axiom	Count
SubClassOf	0
EquivalentClasses	0
DisjointClasses	0
GCI count	0
Hidden GCI Count	0

Object property axioms:


Axiom	Count
SubObjectPropertyOf	0

Ontology prefixes:

Prefix	URI
:	http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/
khs:	http://dh.aks.ac.kr/ontologies/khs#
owl:	http://www.w3.org/2002/07/owl#
rdf:	http://www.w3.org/1999/02/22-rdf-syntax-ns#
rdfs:	

Footer: No Reasoner set. Select a reasoner from the Reasoner menu. ☒ Show Inferences

Active Ontology : Ontology Prefixes 추가 (ekc)



대문

최근 바뀐

임의 문서로

도움말

관리메뉴

한글고문서

궁중기록화

민족기록화

승합비문

역사인물초상화

도구

여기를 가리키는 문서

가리키는 글의 바뀐

특수 문서 목록

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책 만들기

PDF로 다운로드

인쇄용 판

문서

토론

로그인

검색

EKC Data Model-Draft 1.1

한국문화 엔사이브 온톨로지

Ontology Design for the Encyclopedic Archives of Korean Culture

목차 [숨기기]

1 온톨로지란? What is Ontology

2 온톨로지 설계 용어 Terms for Ontology Design

3 **Encyclopedic Archives of Korean Culture Data Model Draft 1.1**

3.1 Core Class

3.2 Contextual Class

3.3 Relation (Object Property)

4 Previous Version

5 Project 별 Ontology 설계 시간

6 Ontology Reference

온톨로지란? What is Ontology

- ‘온톨로지’란 정보화의 대상이 되는 세계를 전자적으로 표현할 수 있도록 구성된 데이터 기술 체계이다. 원래 온톨로지라는 말은 철학에서 ‘존재론’이라고 번역되는 용어로서 ‘존재’에 대한 이해를 추구하는 학문’의 의미를 갖는 말이었다. 그러한 용어가 정보과학 분야에서 중요한 개념으로 등장하게 된 것은 인간이 세계를 이해하는 틀과 컴퓨터가 정보화 대상(콘텐츠)을 이해하는 틀 사이에 유사성이 있다고 보았기 때문이다. 그 틀은 바로 대상을 구성하는 요소들에 대응하는 개념들과 그 개념들 간의 연관 관계이다.^[1] 넓은 의미에서는 모든 정보화의 틀이 다 온톨로지일 수 있겠지만, 대상 자원을 ‘클래스’(class)로 범주화하고, 각각의 클래스에 속하는 개체(individuals)들이 공통의 ‘속성’(attribute)을 갖도록 하고, 그 개체들이 다른 개체들과 맺는 ‘관계’(relation)를 명시적으로 기술하는 것이 가장 일반적인 온톨로지 설계 방법이라고 할 수 있다. (김현, 『디지털 인문학 입문』(HUEBOOKS, 2016) p. 164)
- 정보기술 분야에서 말하는 ‘온톨로지(ontology)’에 대한 가장 일반적인 정의는 그루버(Gruber, Thomas, 1959~)가 말한 ‘명시적 명세화의 방법에 의한 개념화’(explicit specification of a conceptualization)이다.^[2] 여기서 ‘개념화’(conceptualization)라는 것은 정보화하고자 하는 대상 세계를 일정한 체계 속에서 파악하는 것, 예를 들면 그 세계에 무엇이 있고, 그것은 어떤 속성을 품고 있으며, 그것들 사이의 관계는 무엇인가 하는 일정한 질문의 틀 속에서 대상 세계를 이해하는 방식이라고 할 수 있다. ‘명세화’(specification)란 대상 세계에 존재하는 개체, 속성,

Active Ontology : Ontology Prefixes 추가 (ekc)

The screenshot shows the 'Active Ontology' interface with the 'Edit Prefix' dialog box open. The dialog box contains the following elements:

- Prefix name** ②: A text input field containing 'ekc'.
- Prefix** ③: A text input field containing the URL <http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#>.
- Buttons** ④: '확인' (Confirm) and '취소' (Cancel) buttons.

The background interface shows the 'Ontology header' section with the following information:

- Ontology IRI**: <http://dh.aks.ac.kr/ontologies/khs>
- Ontology Version IRI**: <http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9>
- Annotations**: `rdfs:comment` [language: ko] 김현승이 2024년에 만든 디지털유산프로젝트 수업 실습 온톨로지

The 'Ontology prefixes' section shows the following list:

- `owl:` <http://www.w3.org/2002/07/owl#>
- `rdf:` <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
- `rdfs:` <http://www.w3.org/2000/01/rdf-schema#>

Active Ontology : Ontology Prefixes 추가 (ekc)

The screenshot displays the Active Ontology web application interface. The top navigation bar includes tabs for 'Active ontology', 'Entities', 'Classes', 'Object properties', 'Data properties', 'Annotation properties', 'Individuals by class', 'OntoGraf', and 'SPARQL Query'. The main content area is divided into several sections:

- Ontology header:** Displays the 'Ontology IRI' as `http://dh.aks.ac.kr/ontologies/khs` and the 'Ontology Version IRI' as `http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/1.0.0`.
- Annotations:** Shows a comment in Korean: '컬렉션이 2024년에 만든 디지털유산프로젝트 수업 실습 콘텐츠를 담고 있다.'
- Ontology metrics:** A table showing various counts for the ontology.
- Class axioms:** A table showing counts for different types of class axioms.
- Object property axioms:** A table showing counts for different types of object property axioms.
- Ontology prefixes:** A section at the bottom where prefixes are defined. The 'ekc:' prefix is highlighted with a red box, pointing to the URL `http://dh.aks.ac.kr/ontologies/encyclopediaarchivesofkoreanculture#`.

Metric	Count
Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	1

Axiom Type	Count
SubClassOf	0
EquivalentClasses	0
DisjointClasses	0
GCI count	0
Hidden GCI Count	0

Axiom Type	Count
SubObjectPropertyOf	0

Ontology prefixes:

- `:` `http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/`
- `ekc:`** `http://dh.aks.ac.kr/ontologies/encyclopediaarchivesofkoreanculture#`
- `khs:` `http://dh.aks.ac.kr/ontologies/khs#`
- `owl:` `http://www.w3.org/2002/07/owl#`
- `rdfs:` `http://www.w3.org/2000/01/rdf-schema#`

No Reasoner set. Select a reasoner from the Reasoner menu. ☒ Show Inferences

Active Ontology : Ontology Prefixes 추가 (dcterms)

Google

dcterms url

검색



전체

이미지

동영상

쇼핑

뉴스

웹

도서

: 더보기

도구

도움말: 결과를 **한국어**로 표시합니다. 언어별 필터링에 대해서도 자세히 알아보세요.



DCMI

<https://www.dublincore.org> > specifications > dublin-core

DCMI Metadata Terms

2020. 1. 20. — As a result, there exists both a dc:date (<http://purl.org/dc/elements/1.1/date>) with no formal range and a corresponding dcterms:date (<http://purl.org/dc/terms/date>)

Title · Creator · Release History · Type

Active Ontology : Ontology Prefixes 추가 (dcterms)

← → ↻ 📄 dublincore.org/specifications/dublin-core/dcmi-terms/ ☆ 🌐 📄 🌈 🏠 | H ⋮

The four DCMI namespaces are:

- <http://purl.org/dc/elements/1.1/> The `/elements/1.1/` namespace was created in 2000 for the RDF representation of the fifteen-element Dublin Core and has been widely used in data for more than twenty years. This namespace corresponds to the original scope of ISO 15836, which was published first in 2003 and last revised in 2017 as ISO 15836-1:2017 [\[ISO 15836-1:2017\]](#).
- <http://purl.org/dc/terms/> The `/terms/` namespace was originally created in 2001 for identifying new terms coined outside of the original fifteen-element Dublin Core. In 2008, in the context of defining formal semantic constraints for DCMI metadata terms in support of RDF applications, the original fifteen elements themselves were mirrored in the `/terms/` namespace. As a result, there exists both a `dc:date` (<http://purl.org/dc/elements/1.1/date>) with no formal range and a corresponding `dcterms:date` (<http://purl.org/dc/terms/date>) with a formal range of "literal". While these distinctions are significant for creators of RDF applications, most users can safely treat the fifteen parallel properties as equivalent. The most useful properties and classes of DCMI Metadata Terms have now been published as ISO 15836-2:2019 [\[ISO 15836-2:2019\]](#). While the `/elements/1.1/` namespace will be supported indefinitely, DCMI gently encourages use of the `/terms/` namespace.
- <http://purl.org/dc/dcmitype/> The `/dcmitype/` namespace was created in 2001 for the DCMI Type Vocabulary, which defines classes for basic types of thing that can be described using DCMI metadata terms.
- <http://purl.org/dc/dcam/> The `/dcam/` namespace was created in 2008 for terms used in the *description* of DCMI metadata terms.

Each term is specified with the following minimal set of attributes:

Active Ontology : Ontology Prefixes 추가 (dcterms)

1. Click the 'Prefixes' button in the 'Ontology prefixes' section.

2. Enter the prefix name: **dcterms**

Prefix names are usually short and should end with a colon.
Examples are schema:, go: and vehicle:

3. Enter the prefix URI: **http://purl.org/dc/terms#**

Prefixes should not contain spaces and usually end with a slash (/) or hash (#)

4. Click the '확인' (Confirm) button.

최소

Active Ontology : Ontology Prefixes 추가 (dcterms)

The screenshot shows the Active Ontology web interface. The browser address bar displays the URL `http://dh.aks.ac.kr/ontologies/khs`. The interface includes a menu bar with options like File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. Below the menu, there's a tabbed interface with the following tabs: Active ontology, Entities, Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, and SPARQL Query. The 'Active ontology' tab is selected, showing the 'Ontology header' section with the following information:

- Ontology IRI: `http://dh.aks.ac.kr/ontologies/khs`
- Ontology Version IRI: `g http://dh.aks.ac.kr/ontologies/khs/1.0.0`

Below the header, there's an 'Annotations' section with a plus icon. To the right, the 'Ontology metrics' section displays various counts:

Metrics	
Axiom	0
Logical axiom count	0
Declaration axioms count	0
Class count	0
Object property count	0
Data property count	0
Individual count	0
Annotation Property count	0

Below the metrics, there are sections for 'Class axioms' and 'Object property axioms':

Class axioms	
SubClassOf	0
EquivalentClasses	0
DisjointClasses	0
GCI count	0
Hidden GCI Count	0

Object property axioms	
SubObjectPropertyOf	0

The 'Ontology prefixes' tab is selected, showing a list of prefixes. The 'dcterms' prefix is highlighted with a red box:

- Prefixes: `http://www.semanticweb.org/skyp/ontologies/2024/9/untitled-ontology-10/`
- dcterms:** `http://purl.org/dc/terms#`
- ekc: `http://dh.aks.ac.kr/ontologies/encyclopediaarchivesofkoreanculture#`
- khs: `http://dh.aks.ac.kr/ontologies/khs#`
- ont: `http://dh.aks.ac.kr/ontologies/khs#`

The status bar at the bottom indicates 'No Reasoner set. Select a reasoner from the Reasoner menu' and 'Show Inferences'.

4

프로테제 실습 - Entities

Entities : Sub Class 추가

① 클릭

또는 우클릭 > Add subclass

The screenshot shows the KHS application window with the following components:

- Menu Bar:** File, Edit, View, Reasoner, Tools, Refactor, Window, Help.
- Toolbar:** Includes icons for file operations and a search icon.
- Active ontology:** khs (http://dh.aks.ac.kr/ontologies/khs).
- Entity List:** Shows 'owl:Thing' as the active entity.
- Class hierarchy:** Displays the hierarchy for 'owl:Thing'.
- Context Menu:** A red box highlights the 'Add subclass...' option, which has the keyboard shortcut 'Ctrl-E'.
- Annotations:** Shows the 'Annotations' tab for 'owl:Thing'.
- Description:** Shows the 'Description' tab for 'owl:Thing'.

Entities : Sub Class 추가

② 입력

Active ontology: khs (http://dh.aks.ac.kr/ontologies/khs)

Classes: owl:Thing

Annotations: owl:Thing

Create a new Class

Name: Actor

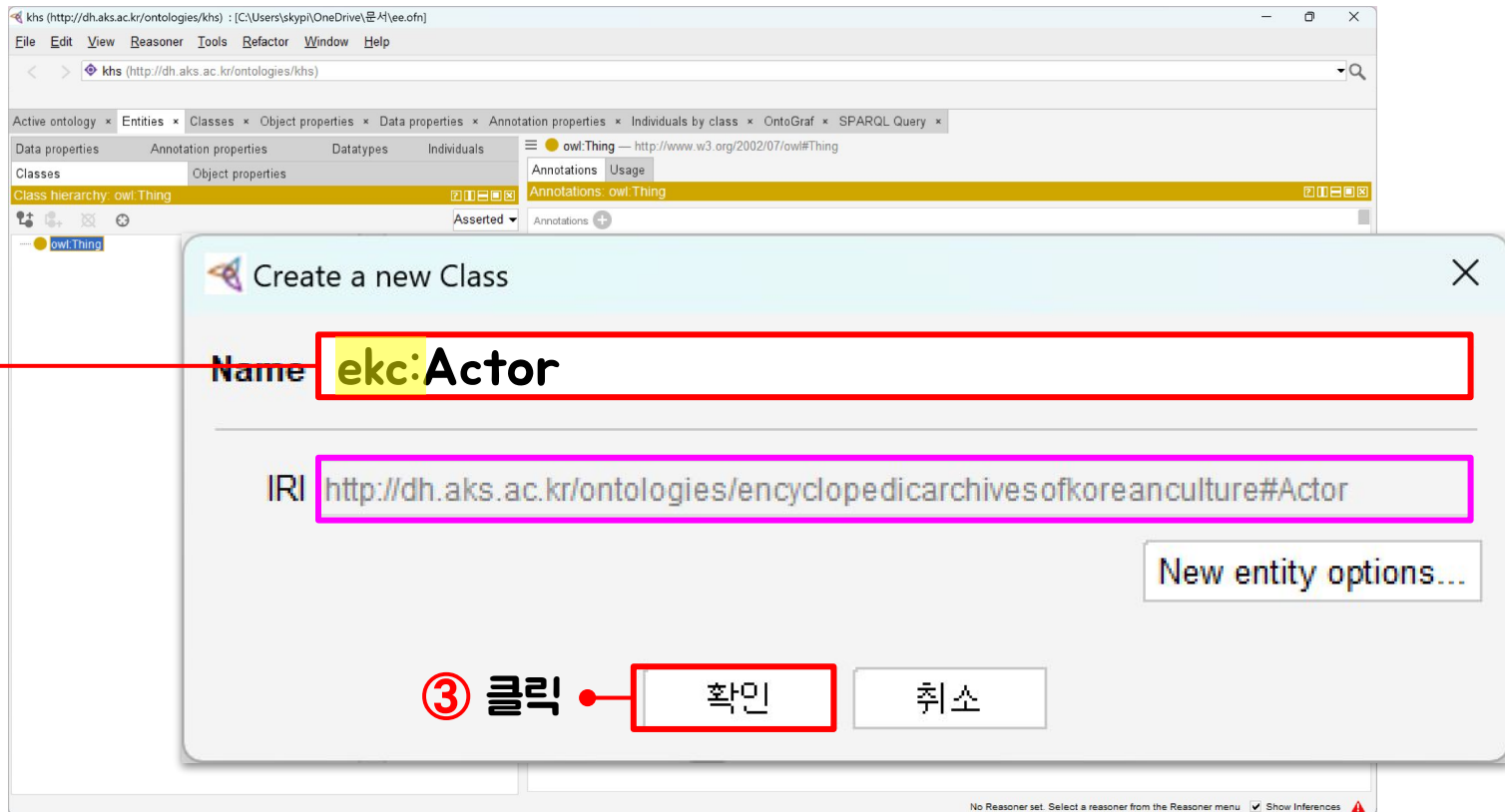
IRI: http://dh.aks.ac.kr/ontologies/khs#Actor

New entity options...

확인 취소

Entities : Sub Class 추가

② 입력

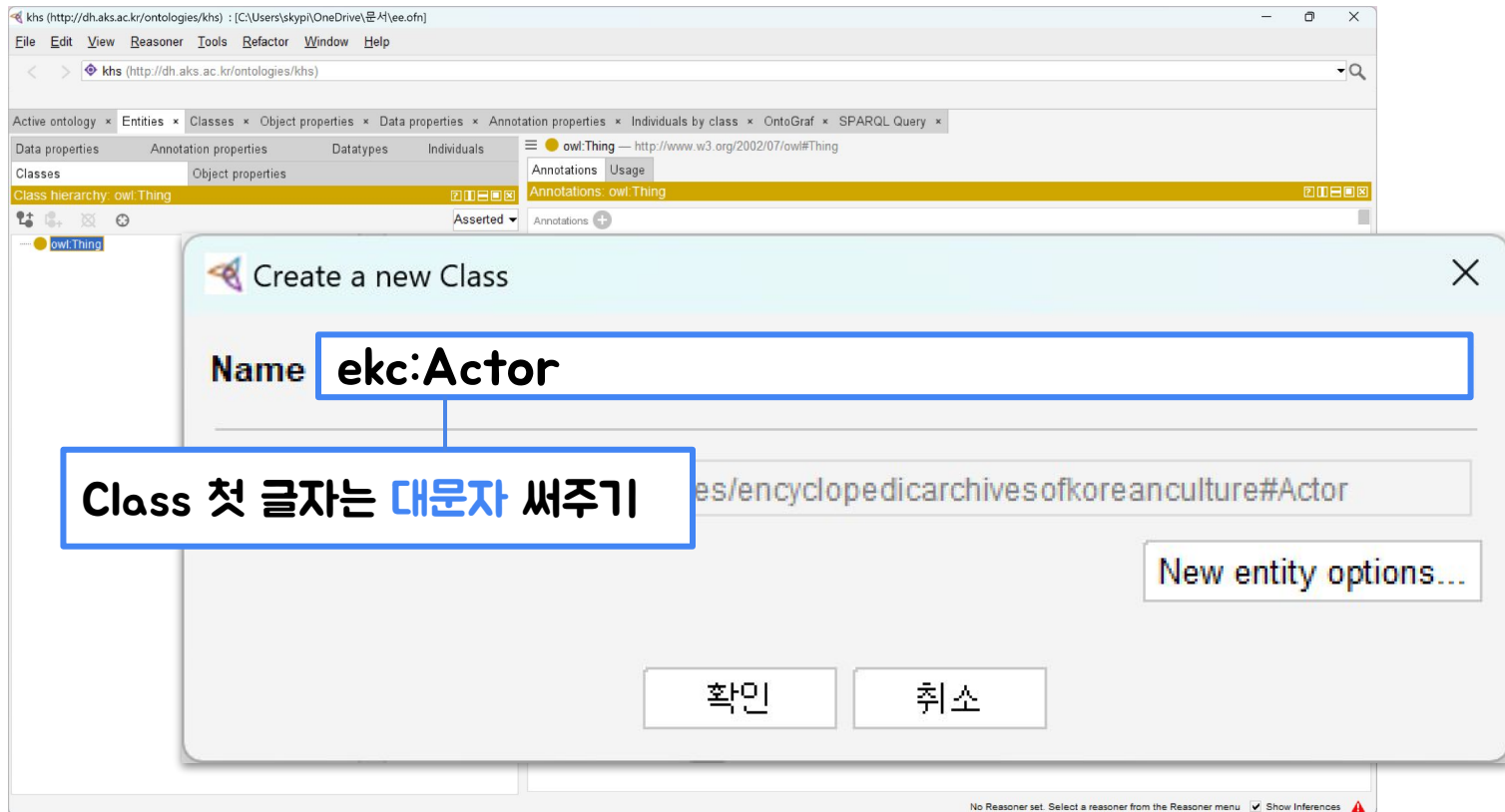


Entities : Sub Class 추가

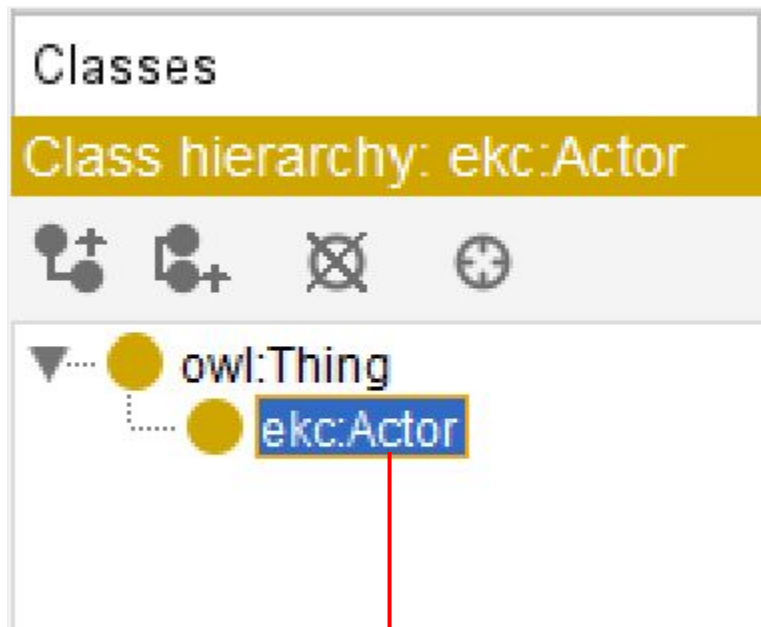
The screenshot displays the KHS (Knowledge Hierarchy Studio) interface. The main window shows the ontology structure for 'khs' (http://dh.aks.ac.kr/ontologies/khs). The 'Entities' tab is active, showing a class hierarchy for 'ekc:Actor'. A red box highlights the 'ekc:Actor' class in the hierarchy, and another red box highlights its full URI: 'ekc:Actor — http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor'. A red arrow points from the highlighted class in the hierarchy to the highlighted URI. The right panel shows the 'Annotations' tab for 'ekc:Actor', which is currently empty. The bottom panel shows the 'Description' tab for 'ekc:Actor', which is also empty. The status bar at the bottom indicates 'No Reasoner set. Select a reasoner from the Reasoner menu' and 'Show Inferences'.

추가한 클래스의 풀버전 URI 확인

※ Class 규칙

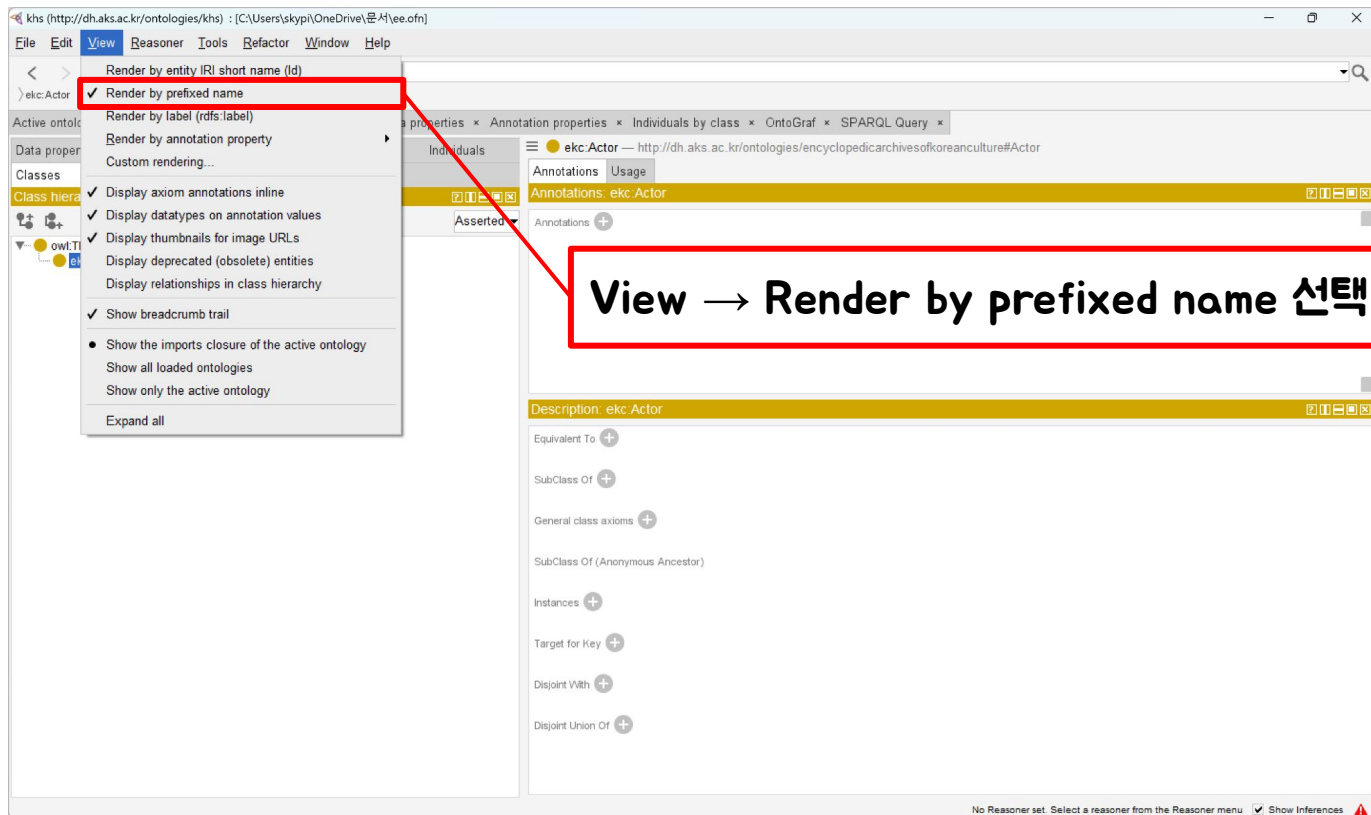


※ View : Render by prefixed name



만약 글씨가 이렇게 보이지 않는다면,

⌘ View : Render by prefixed name



Entities : Sub Class 추가

② 클릭

① owl:Thing 선택

③ 입력

④ 클릭

Create a new Class

Name **ekc:Place**

IRI **http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Place**

New entity options...

확인 취소

Entities : Sub Class 추가

② 클릭

① owl:Thing 선택

③ 입력

④ 클릭

Create a new Class

Name **ekc:Object**

IRI `http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Object`

New entity options...

확인 취소

Entities : Sub Class 추가

② 클릭

① ekc:Actor 선택

③ 입력

④ 클릭

Create a new Class

Name **ekc:Group**

IRI **http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Group**

New entity options...

확인 취소

Entities : Sub Class 추가

② 클릭

① ekc:Actor 선택

③ 입력

④ 클릭

Create a new Class

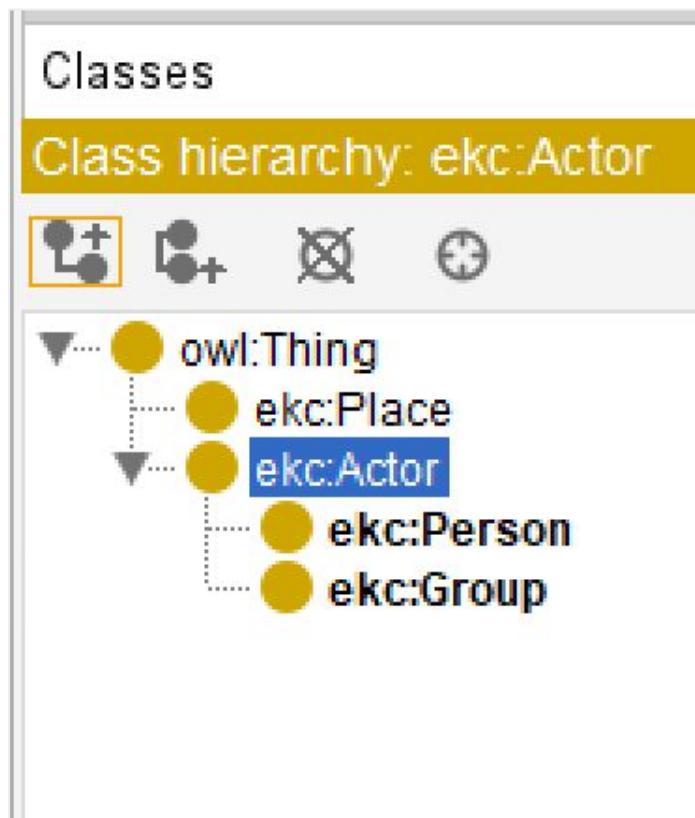
Name **ekc:Person**

IRI **http://dh.aks.ac.kr/ontologies/encyclopediaofkoreanculture#Person**

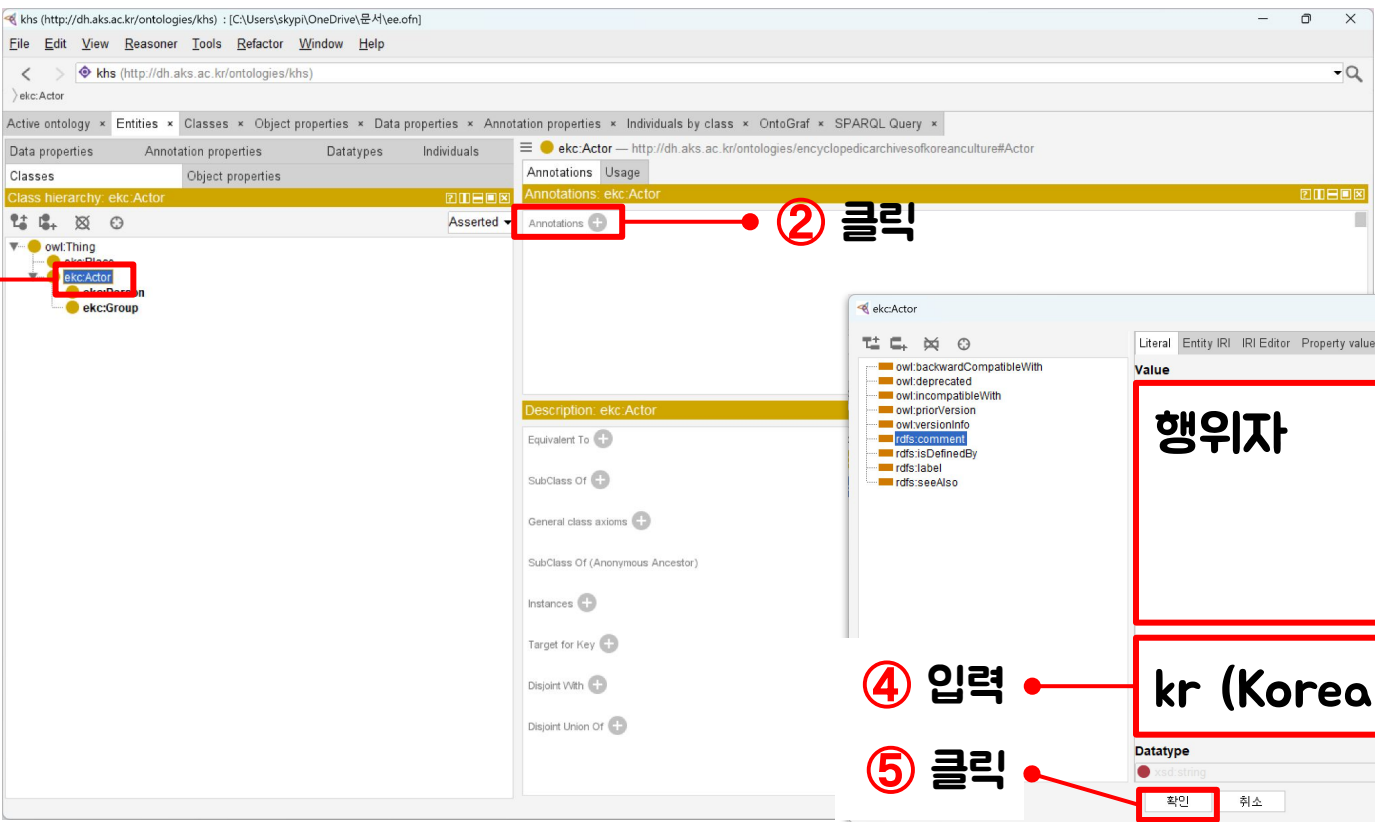
New entity options...

확인 취소

Entities : Sub Class 추가



Entities : Class Annotation 입력



① 클릭

② 클릭

③ 입력

④ 입력

⑤ 클릭

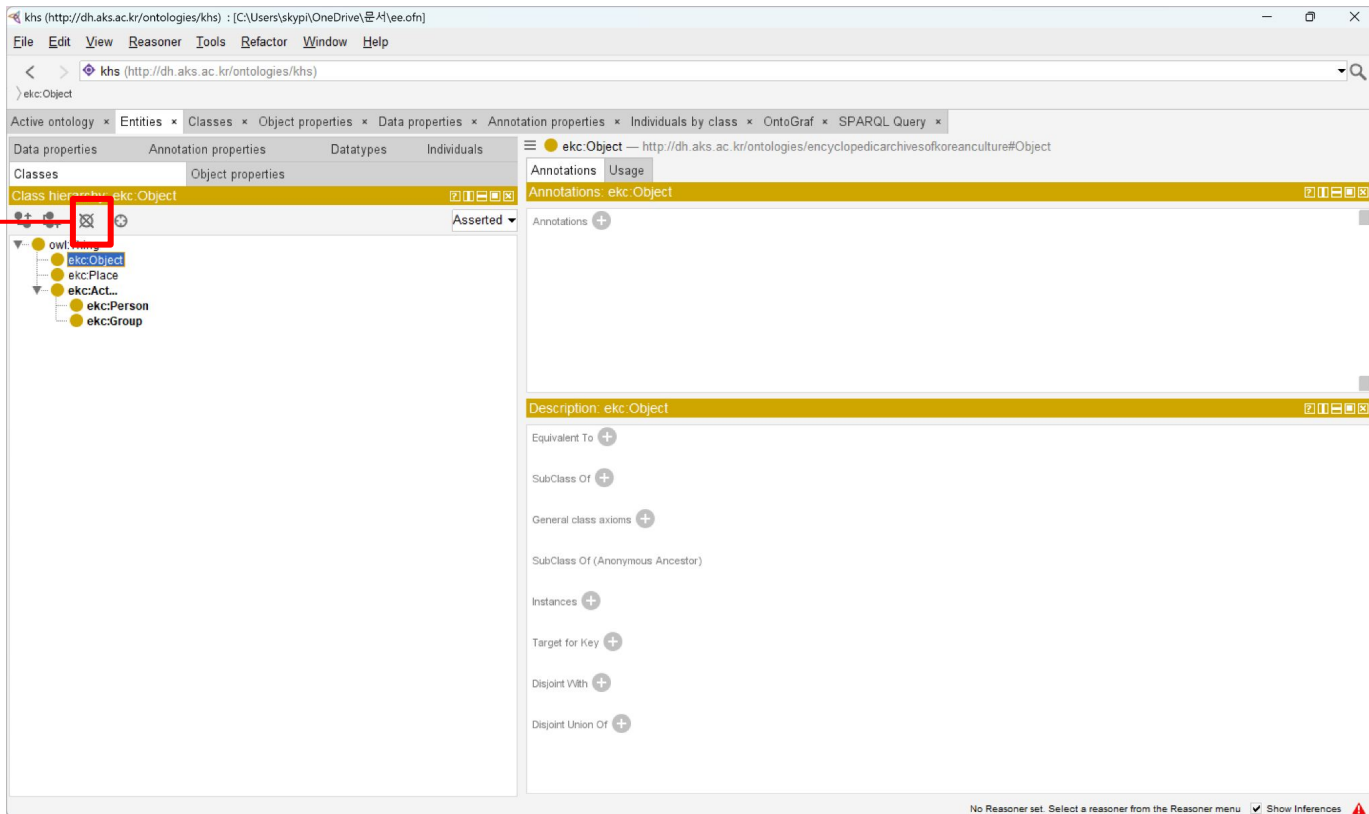
행위자

kr (Korean)

확인 취소

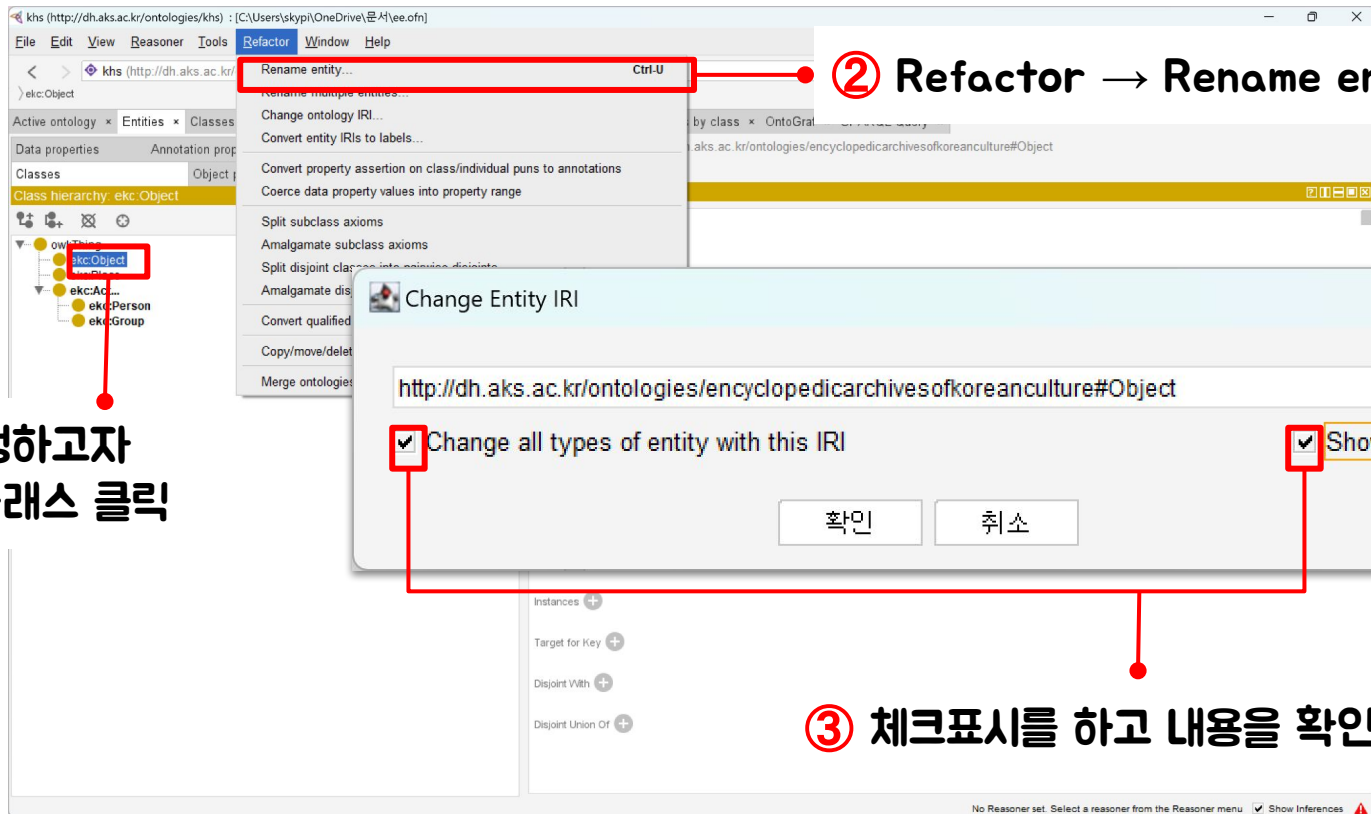
✖ Delete (삭제)

클릭



✖ Rename entity (수정)

① 수정하고자
하는 클래스 클릭



② Refactor → Rename entity 클릭

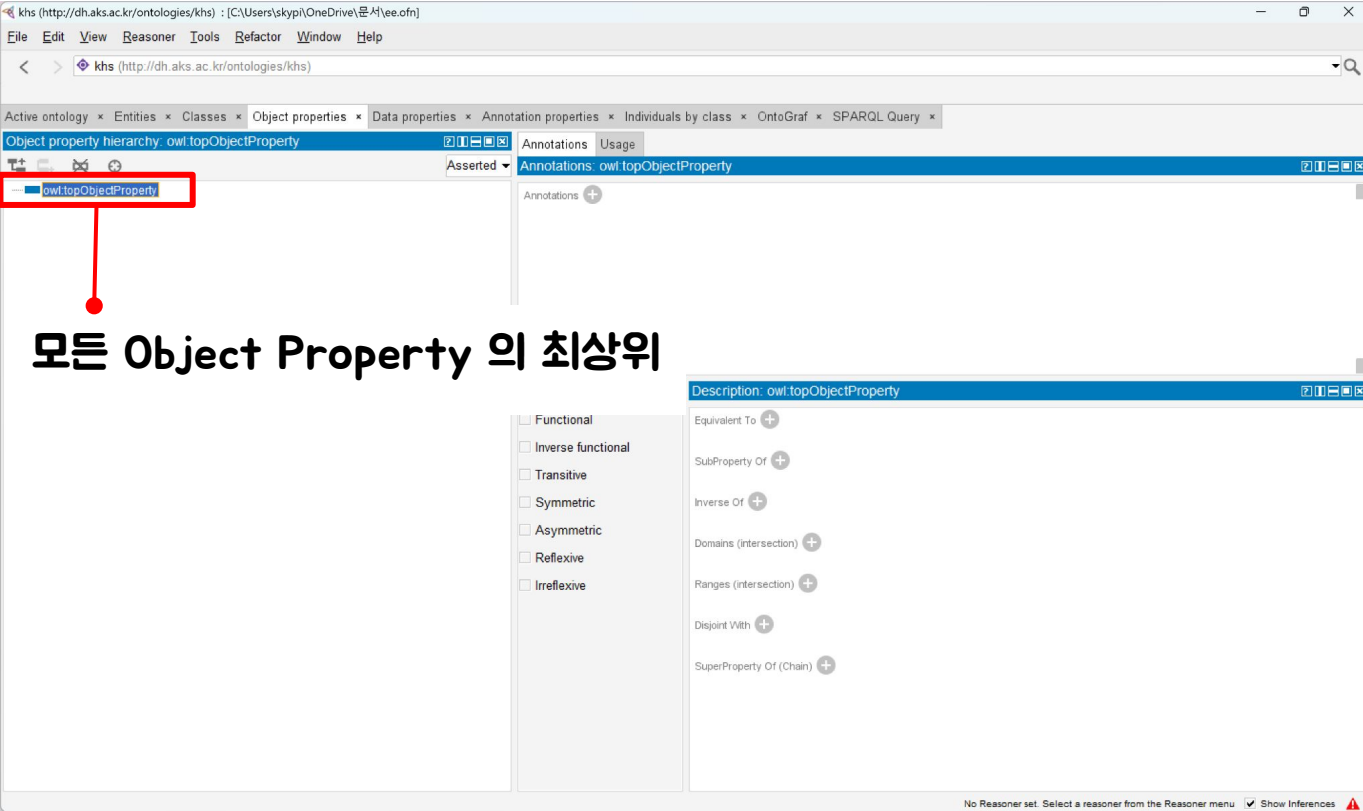
③ 체크표시를 하고 내용을 확인한다.



5

프로테제 실습 - Object properties

Object properties : Sub Property 추가



모든 Object Property 의 최상위

Functional

Inverse functional

Transitive

Symmetric

Asymmetric

Reflexive

Irreflexive

Equivalent To +

SubProperty Of +

Inverse Of +

Domains (intersection) +

Ranges (intersection) +

Disjoint With +

SuperProperty Of (Chain) +

No Reasoner set. Select a reasoner from the Reasoner menu. Show Inferences

Object properties : Sub Property 추가

① 클릭

② 입력

③ 클릭

Create a new Object property

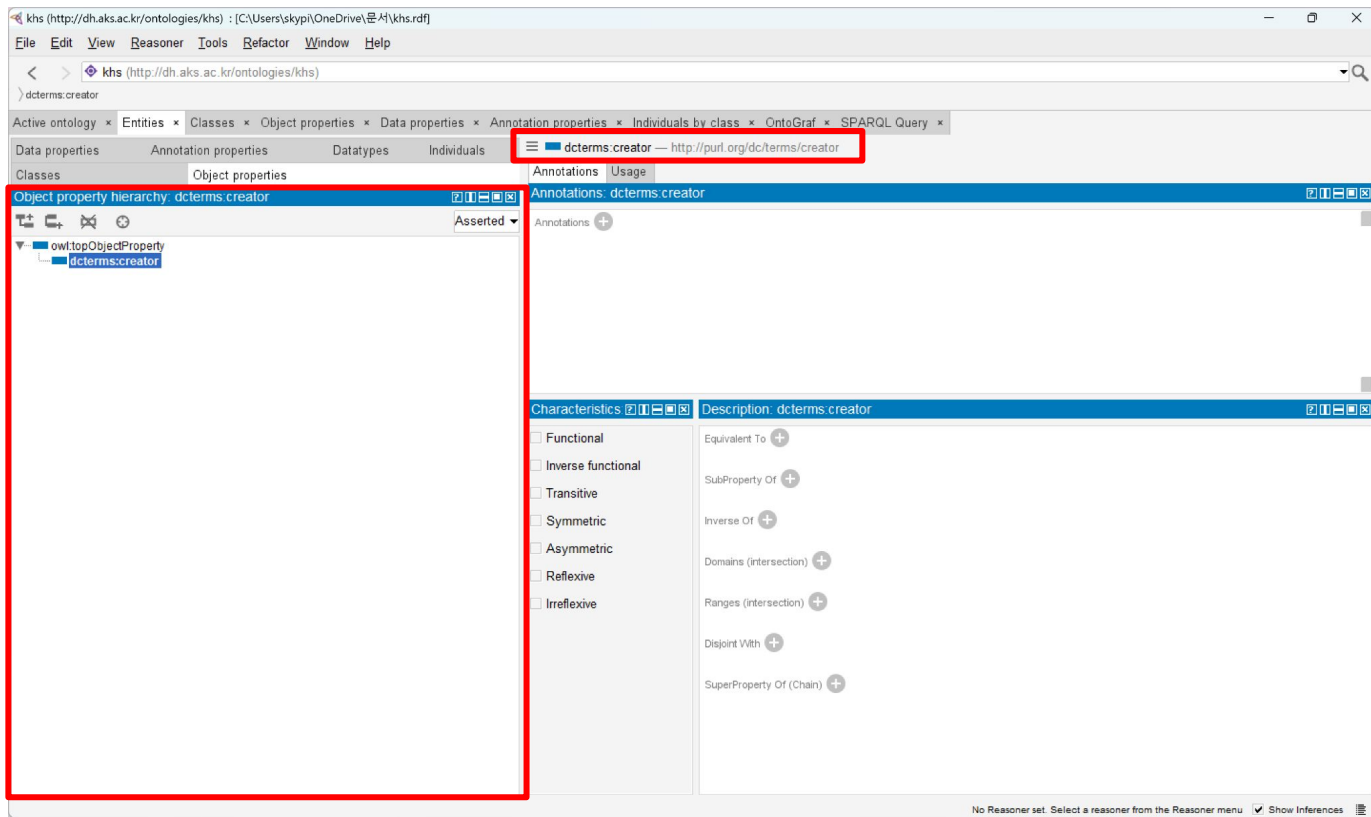
Name **ekc:creator**

IRI **http://purl.org/dc/terms/creator**

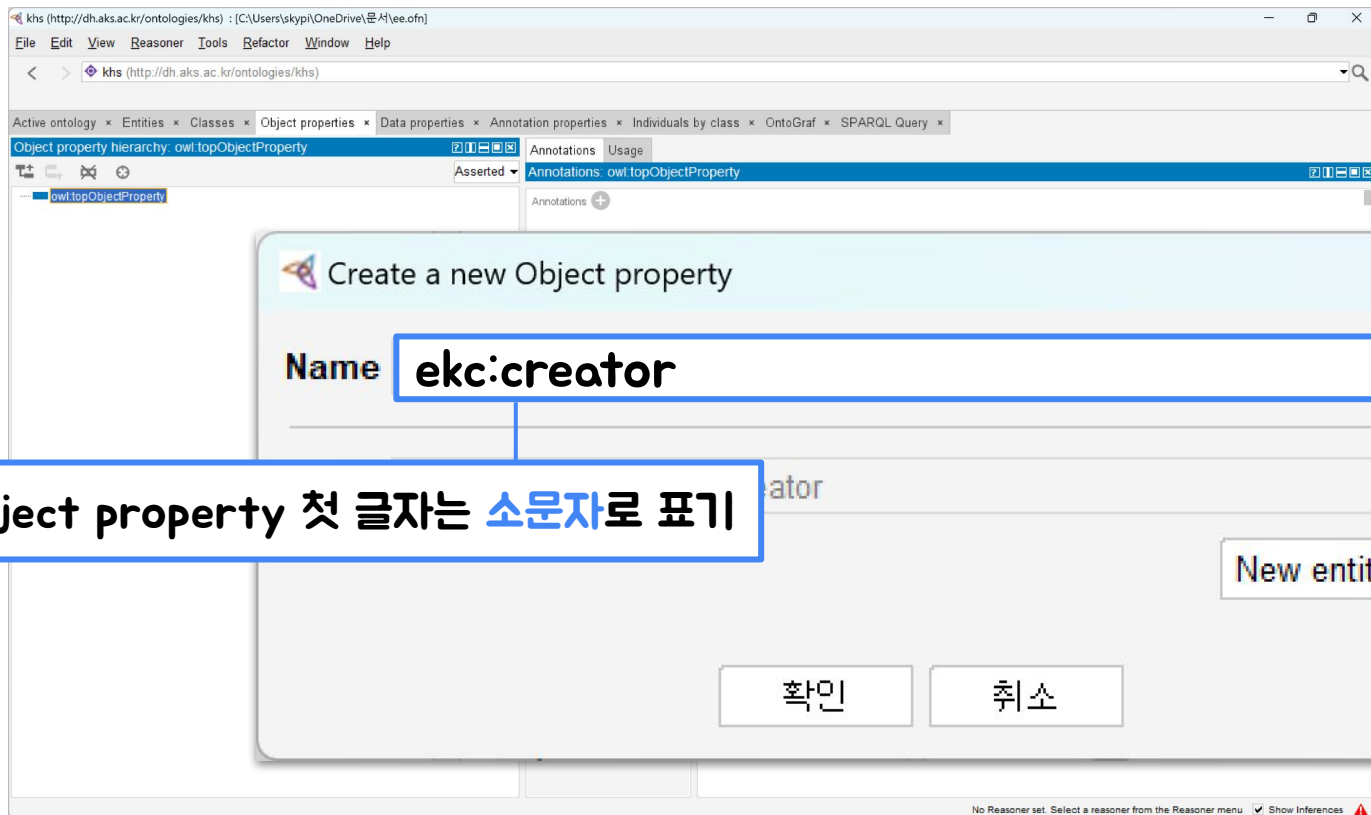
New entity options...

확인 취소

Object properties : Sub Property 추가



※ Object property 규칙



Object properties : Property Annotation 입력

1 클릭

2 입력

3 선택

4 클릭

창작자

ko (Korean)

확인 취소

Object properties : Property Annotation 입력

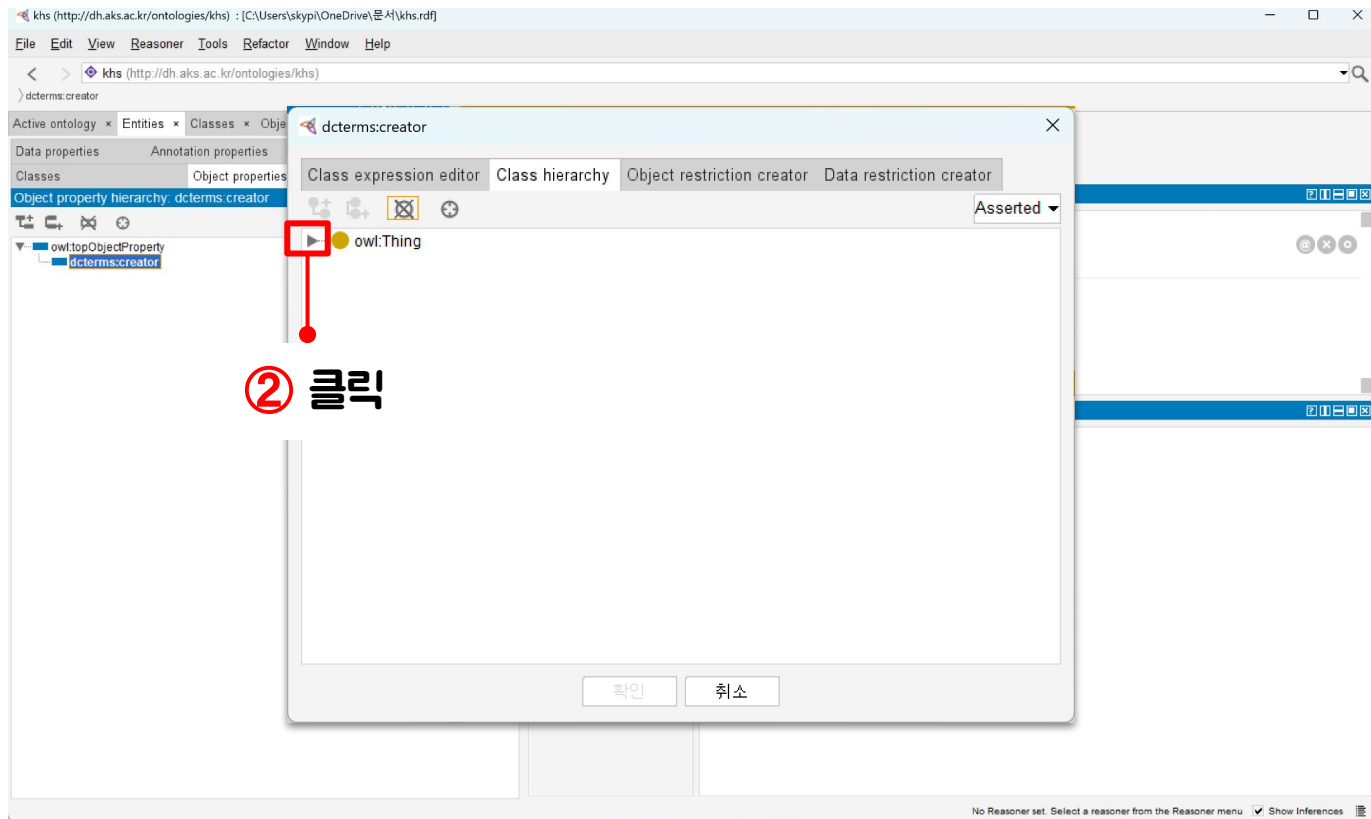
The screenshot displays the KHS (Knowledge Hierarchy System) interface for editing the 'dterms:creator' object property. The main window is titled 'khs (http://dh.aks.ac.kr/ontologies/khs)' and shows a menu bar with 'File', 'Edit', 'View', 'Reasoner', 'Tools', 'Refactor', 'Window', and 'Help'. The left sidebar shows the 'Object property hierarchy' for 'dterms:creator', with 'owl:topObjectProperty' and 'dterms:creator' listed. The main area is divided into two panes: 'Annotations' and 'Characteristics'. The 'Annotations' pane, highlighted with a red box, shows a single annotation: 'rdfs:comment [language: ko] 창작자'. The 'Characteristics' pane shows a list of checkboxes for property constraints: Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive. The 'Description' pane on the right lists various property relationships: Equivalent To, SubProperty Of, Inverse Of, Domains (intersection), Ranges (intersection), Disjoint With, and SuperProperty Of (Chain). The status bar at the bottom indicates 'No Reasoner set. Select a reasoner from the Reasoner menu' and 'Show Inferences'.

Object properties : Domain / Range 입력

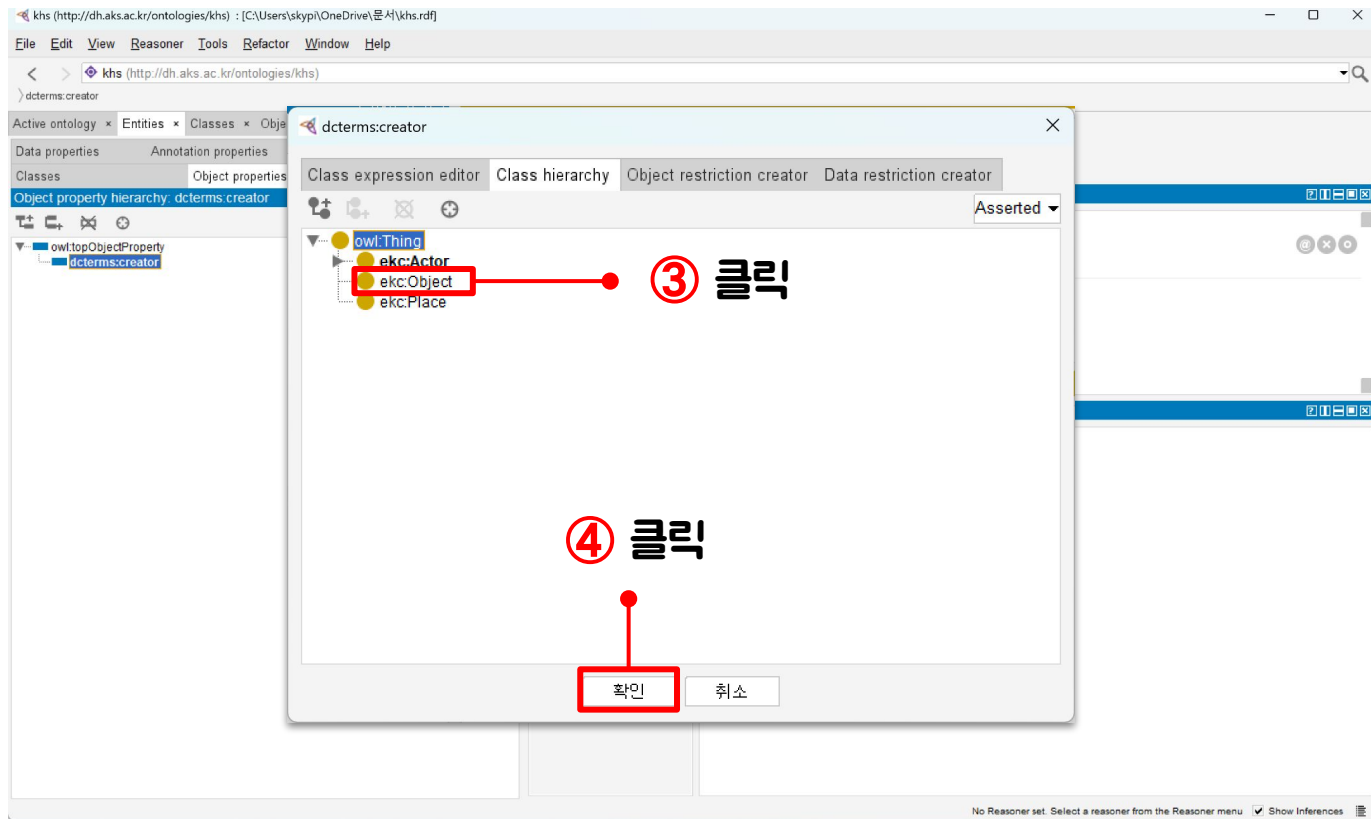
The screenshot shows the Protege ontology editor interface. The main window displays the 'Object property hierarchy' for 'dterms:creator'. The 'Object properties' tab is selected, and the 'Object property hierarchy' panel shows 'dterms:creator' under 'owl:topObjectProperty'. The 'Annotations' panel shows 'rdf:type' with the value 'dterms:creator'. The 'Characteristics' panel is open, showing various property characteristics. A red circle with the number '1' and the Korean word '클릭' (click) points to the 'Domains (intersection)' button in the 'Characteristics' panel. The 'Description' panel shows the property 'dterms:creator' with the value '창작자' (creator) and the language 'ko'.

① 클릭

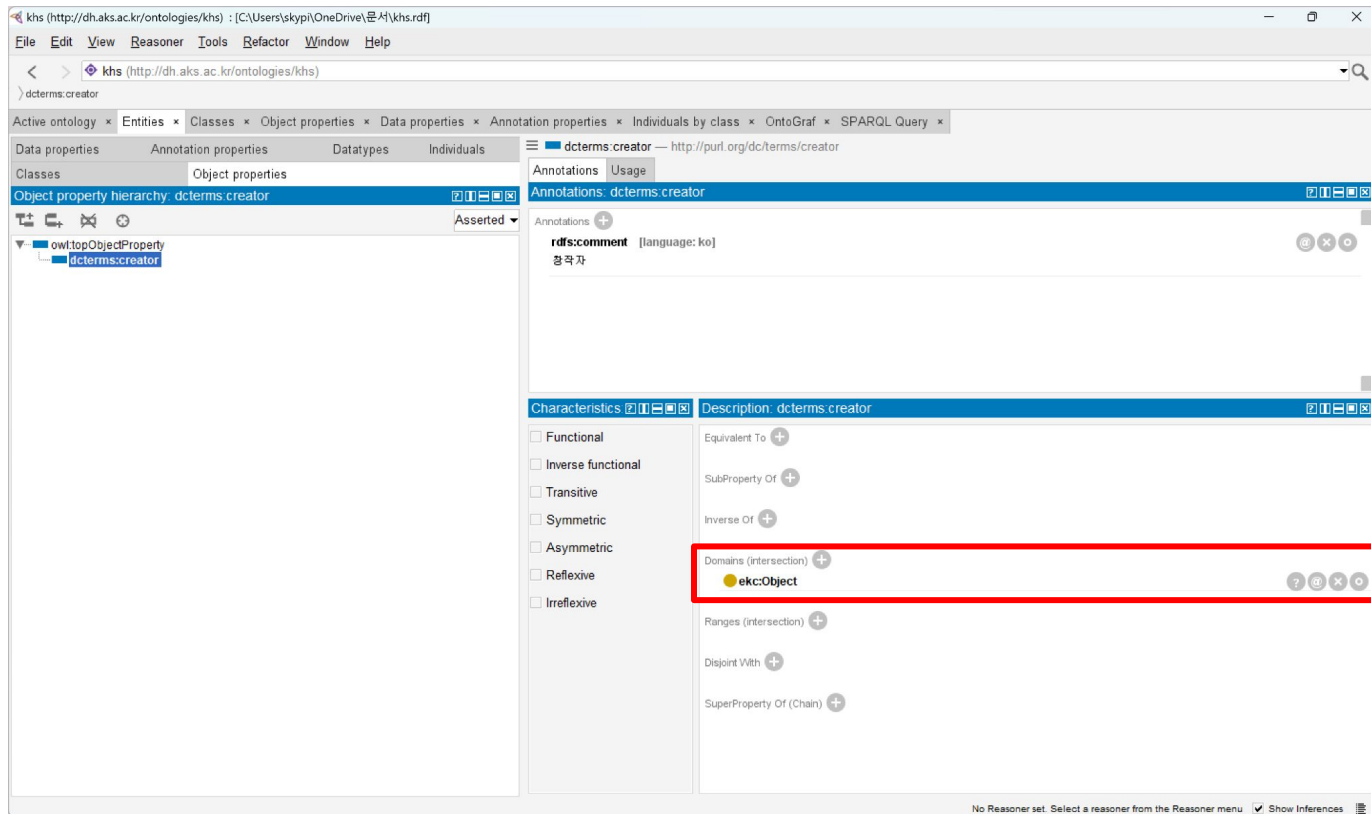
Object properties : Domain / Range 입력



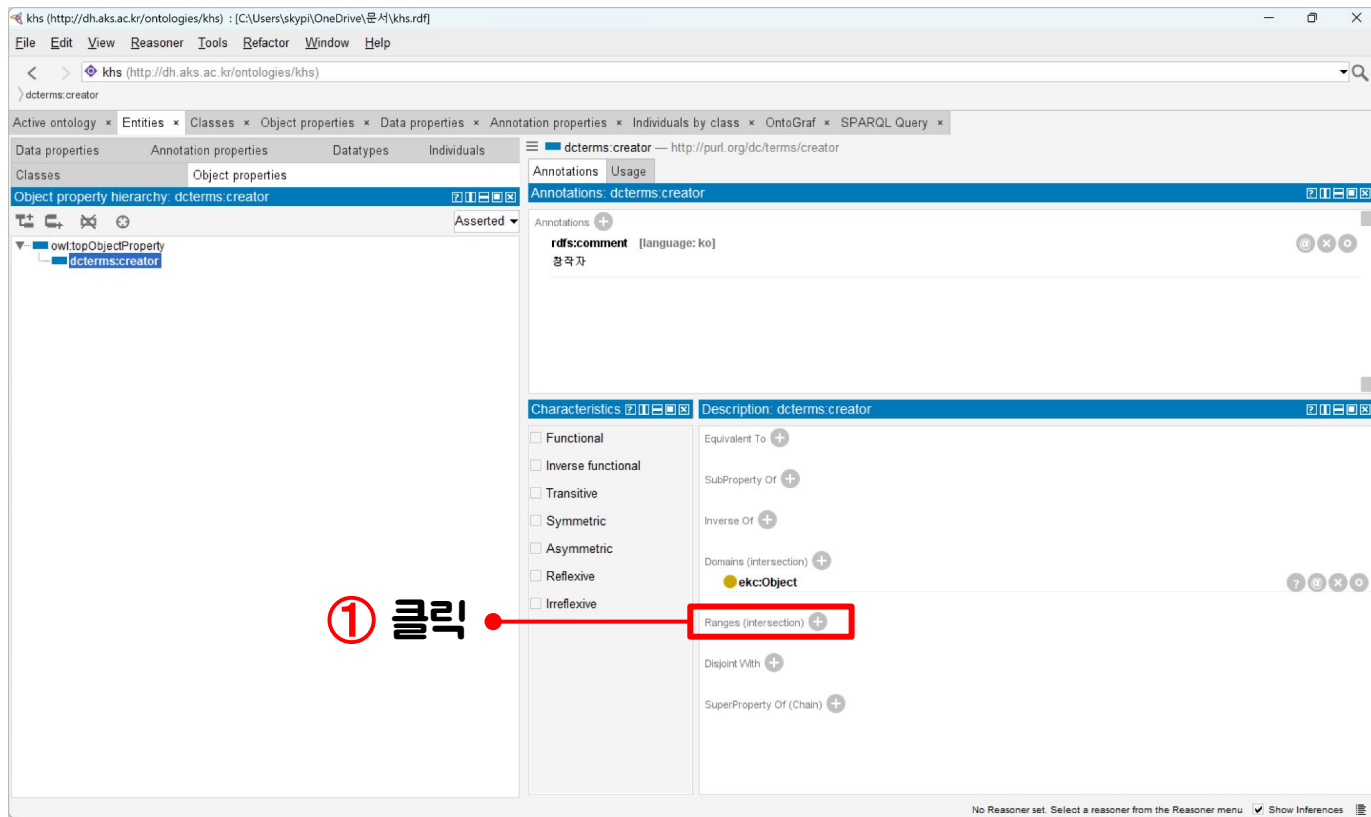
Object properties : Domain / Range 입력



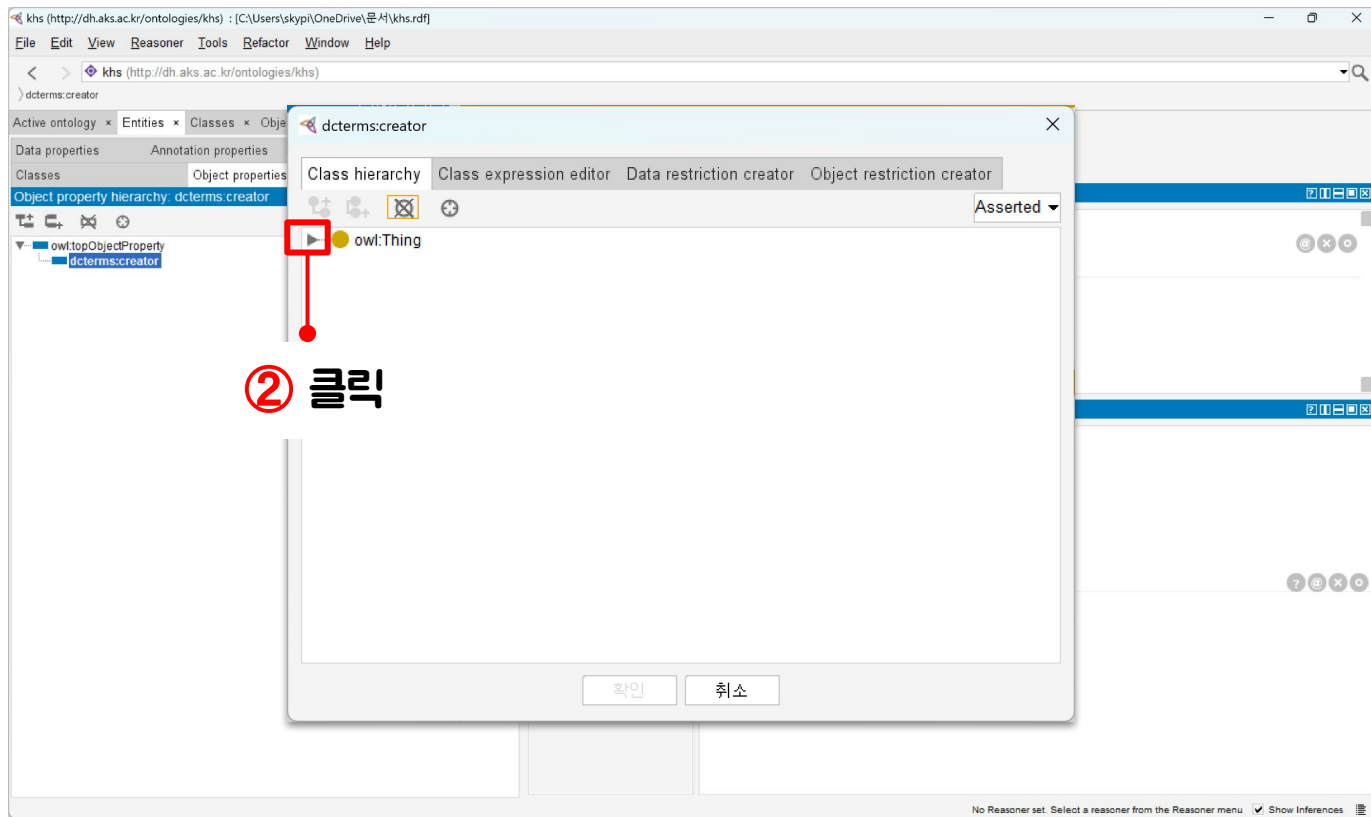
Object properties : Domain / Range 입력



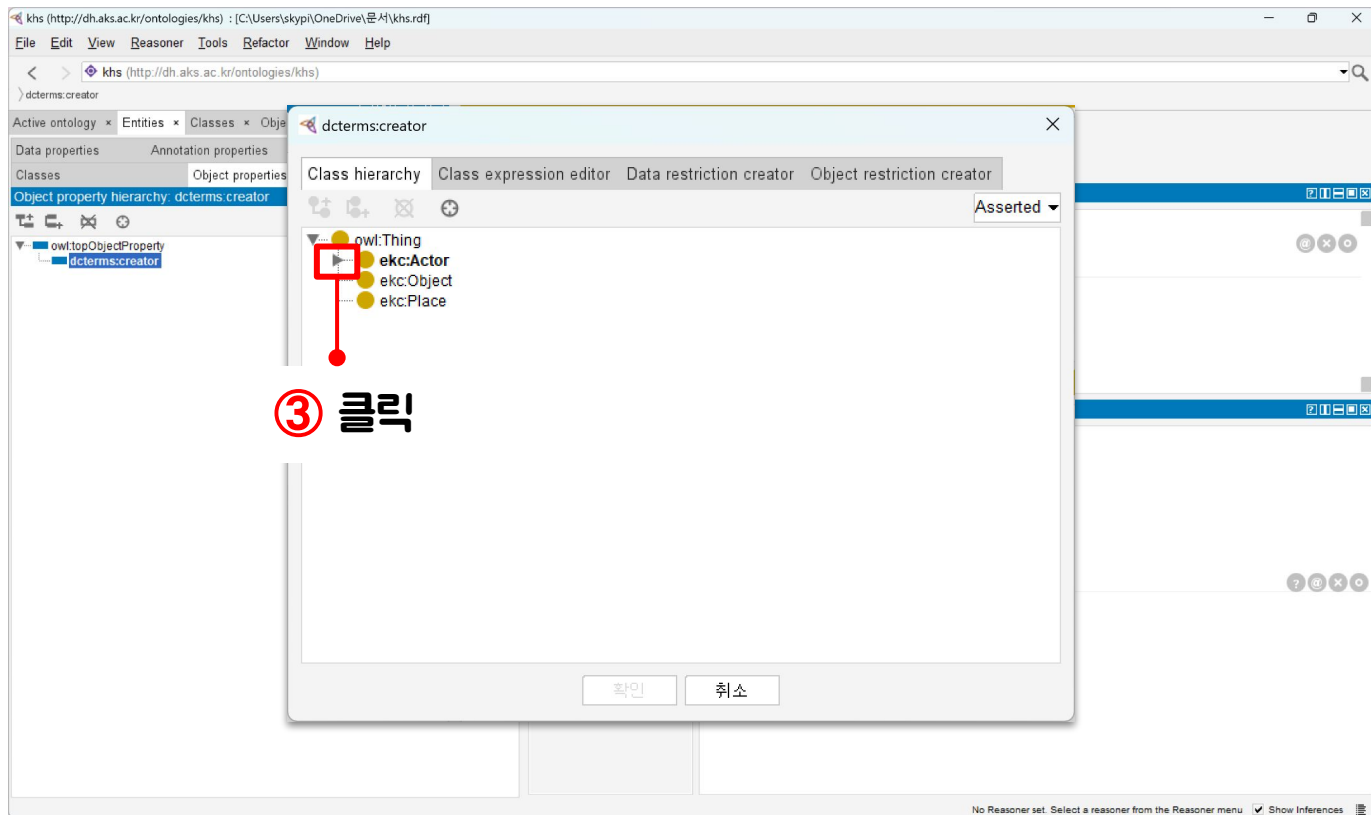
Object properties : Domain / Range 입력



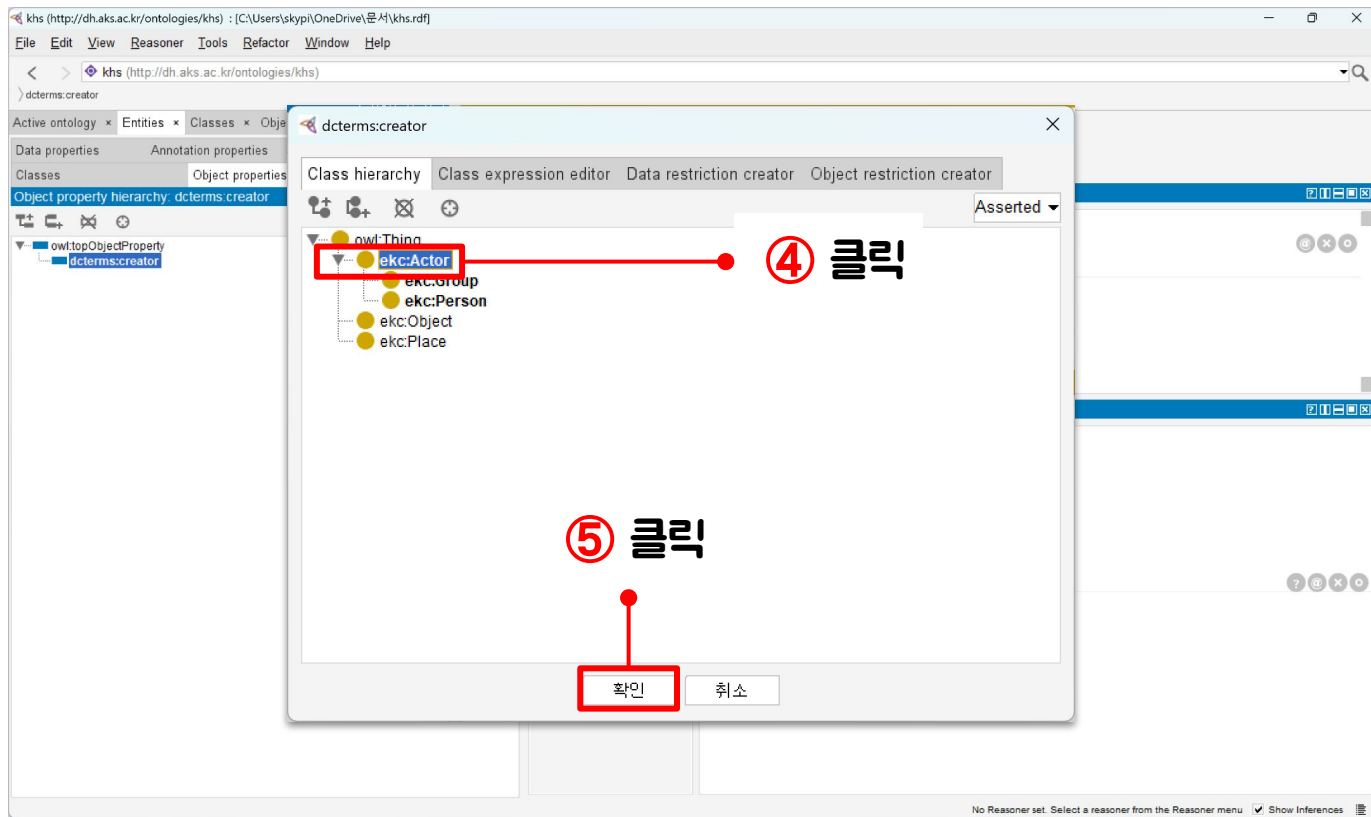
Object properties : Domain / Range 입력



Object properties : Domain / Range 입력



Object properties : Domain / Range 입력



Object properties : Domain / Range 입력

The screenshot displays the KHS (Knowledge Hierarchy System) interface, specifically the configuration page for the object property `rdfrs:comment` within the ontology `dterms:creator`. The interface is divided into several panels:

- Left Panel:** Shows the ontology structure with `dterms:creator` selected under `owl:topObjectProperty`.
- Top Panel:** Contains the menu bar (File, Edit, View, Reasoner, Tools, Refactor, Window, Help) and the address bar showing the URL `http://dh.aks.ac.kr/ontologies/khs`.
- Object property hierarchy:** Displays the selected property `rdfrs:comment` and its domain `ekc:Actor`.
- Annotations:** Shows the annotation `rdfrs:comment` with the value `[language: ko]` and the label `평작자`.
- Characteristics:** A list of checkboxes for property characteristics: Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive. All are currently unchecked.
- Description:** A section for defining the property's domain and range. It includes fields for `Equivalent To`, `SubProperty Of`, `Inverse Of`, `Domains (intersection)` (set to `ekc:Object`), `Ranges (intersection)` (set to `ekc:Actor`), `Disjoint With`, and `SuperProperty Of (Chain)`. The `Ranges (intersection)` field is highlighted with a red box.

The status bar at the bottom indicates "No Reasoner set. Select a reasoner from the Reasoner menu" and "Show Inferences".

※ Domain / Range 선택 시 주의

khs (http://dh.aks.ac.kr/ontologies/khs) : [C:\Users\skypil\OneDrive\문서\khs.rdf]

File Edit View Reasoner Tools Refactor Window Help

< > khs (http://dh.aks.ac.kr/ontologies/khs)

dterms:creator

Active ontology x Entities x Classes x Object properties

Data properties Annotation properties

Classes Object properties

Object property hierarchy dterms:creator

owl:Thing

- ekc:Actor
 - ekc:Group
 - ekc:Person
- ekc:Object
- ekc:Place

Class hierarchy Class expression editor Data restriction creator Object restriction creator

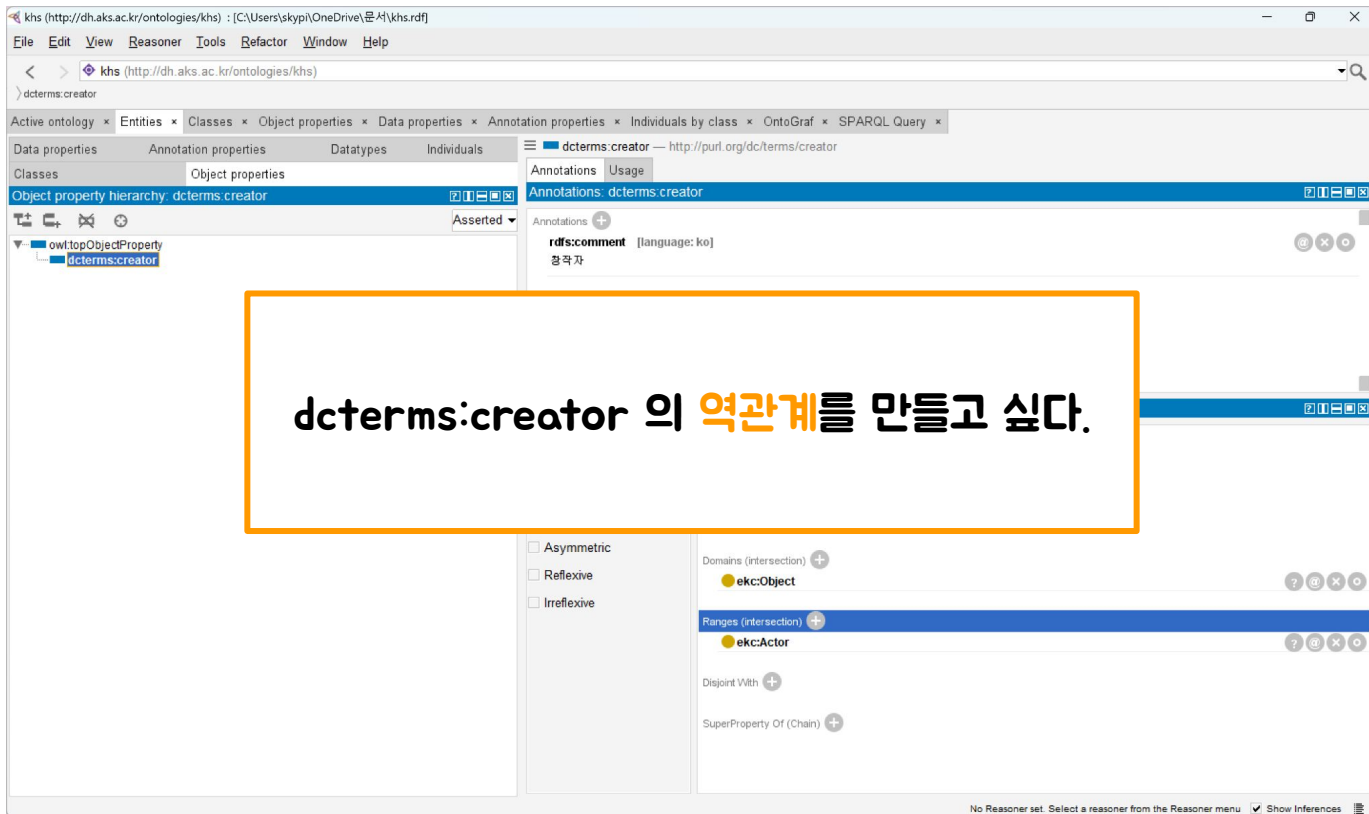
Asserted

상황에 따라 하위 클래스 선택 가능.
그럴 경우 상위 클래스는 포함되지
않는다.

확인 취소

No Reasoner set. Select a reasoner from the Reasoner menu Show Inferences

Object properties : 역관계 입력



The screenshot displays the KHS (Knowledge Hierarchy System) interface, specifically the 'Object properties' configuration page for the 'dterms:creator' property. The interface includes a menu bar (File, Edit, View, Reasoner, Tools, Refactor, Window, Help) and a toolbar. The main area is divided into several panels:

- Object property hierarchy:** Shows the hierarchy of object properties, with 'dterms:creator' selected.
- Annotations:** Displays the annotation 'rdf:type' with the value 'ekc:Actor'.
- Domains (intersection):** Shows the domain 'ekc:Object'.
- Ranges (intersection):** Shows the range 'ekc:Actor'.
- Disjoint With:** Shows the disjoint with property.
- SuperProperty Of (Chain):** Shows the superproperty of chain.

The text overlay in the center of the image states: **dterms:creator 의 역관계를 만들고 싶다.**

Object properties : 역관계 입력

The screenshot displays the KHS interface for editing the ontology 'dterms:creator'. The 'Object properties' tab is active, showing the 'Object property hierarchy' on the left and the 'Annotations' and 'Characteristics' panels on the right.

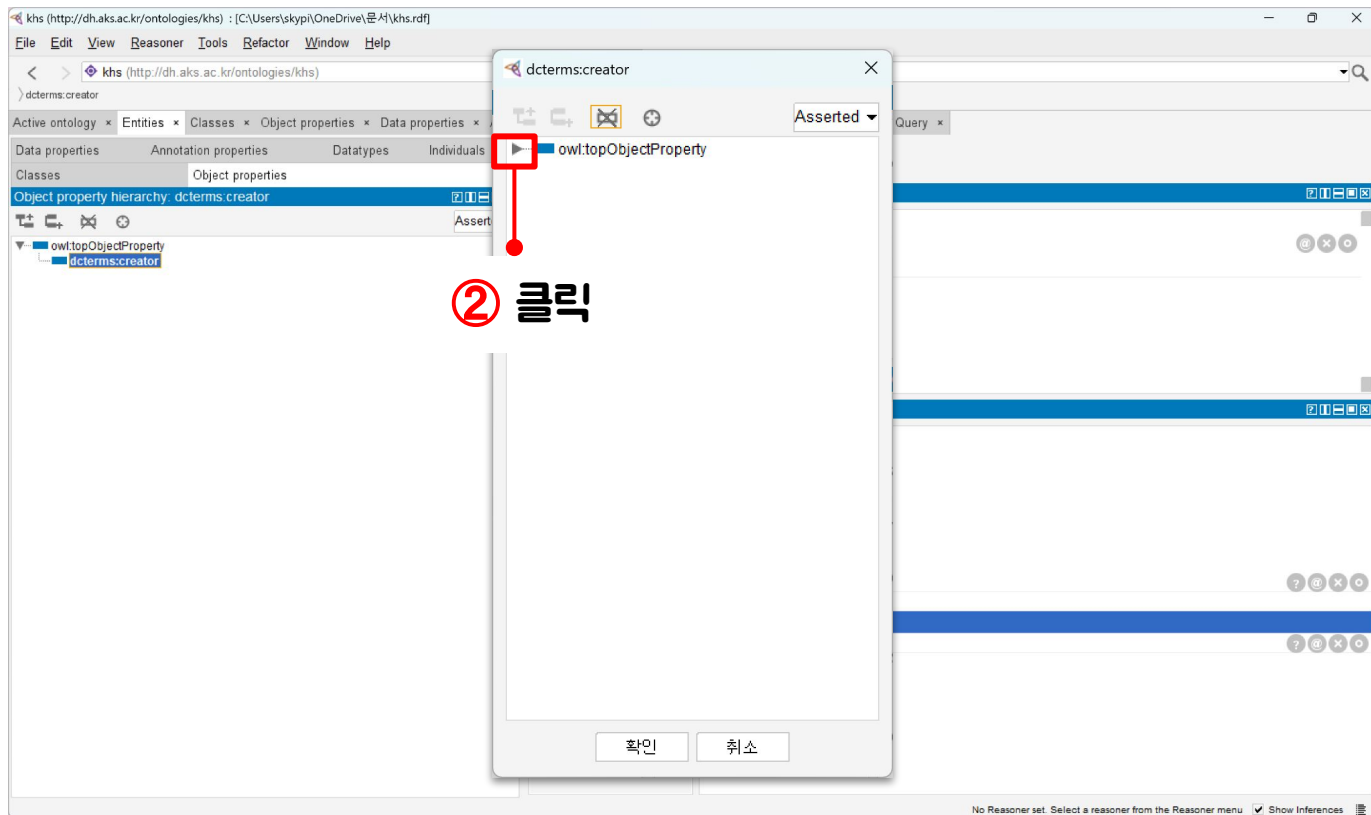
In the 'Annotations' panel, the property is annotated with 'language: ko' and the Korean text '제작자'.

In the 'Characteristics' panel, the 'Inverse Of' checkbox is highlighted with a red box and a red arrow pointing to it from the text '① 클릭' (Click 1).

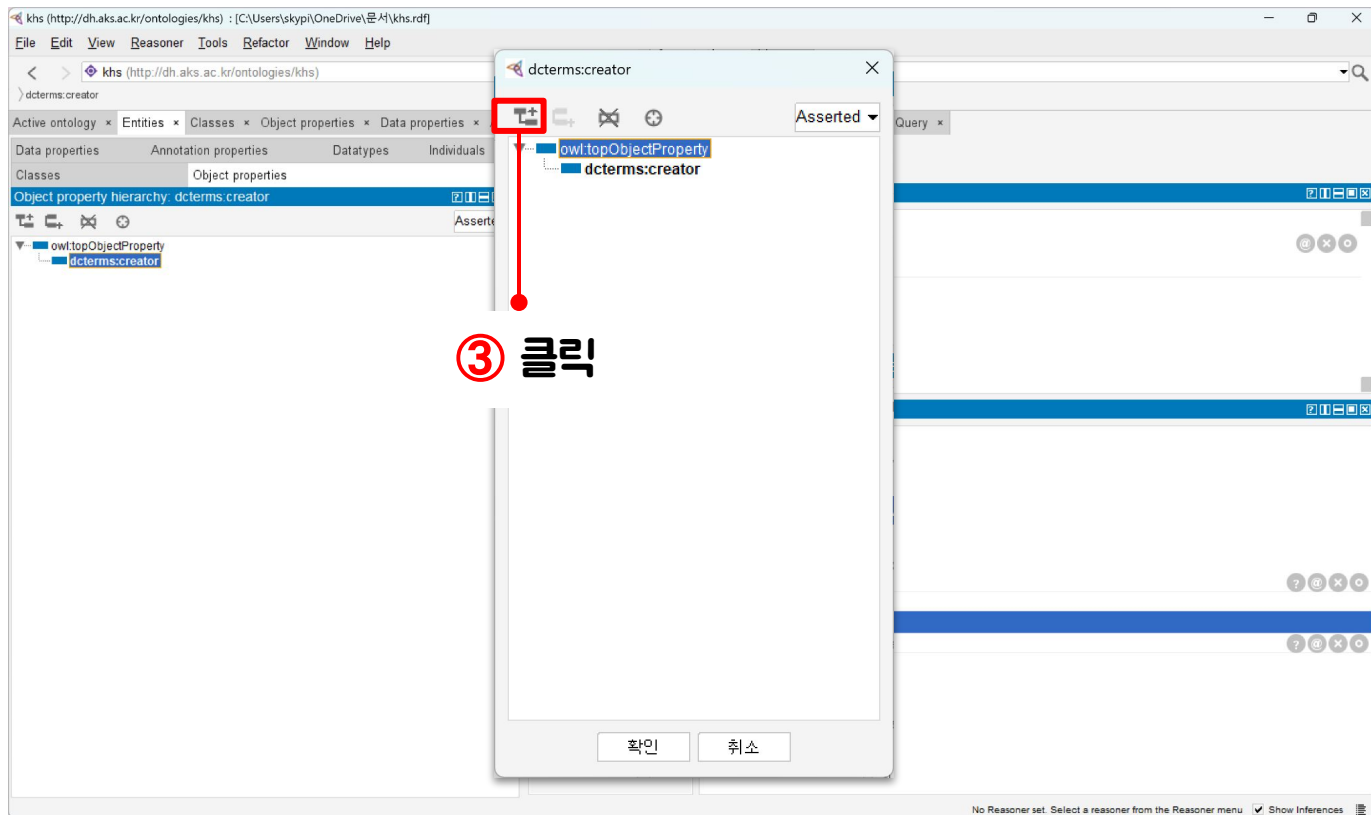
The 'Inverse Of' panel shows the property 'ekc:Actor' as the inverse of 'dterms:creator'.

The bottom status bar indicates 'No Reasoner set. Select a reasoner from the Reasoner menu' and 'Show Inferences'.

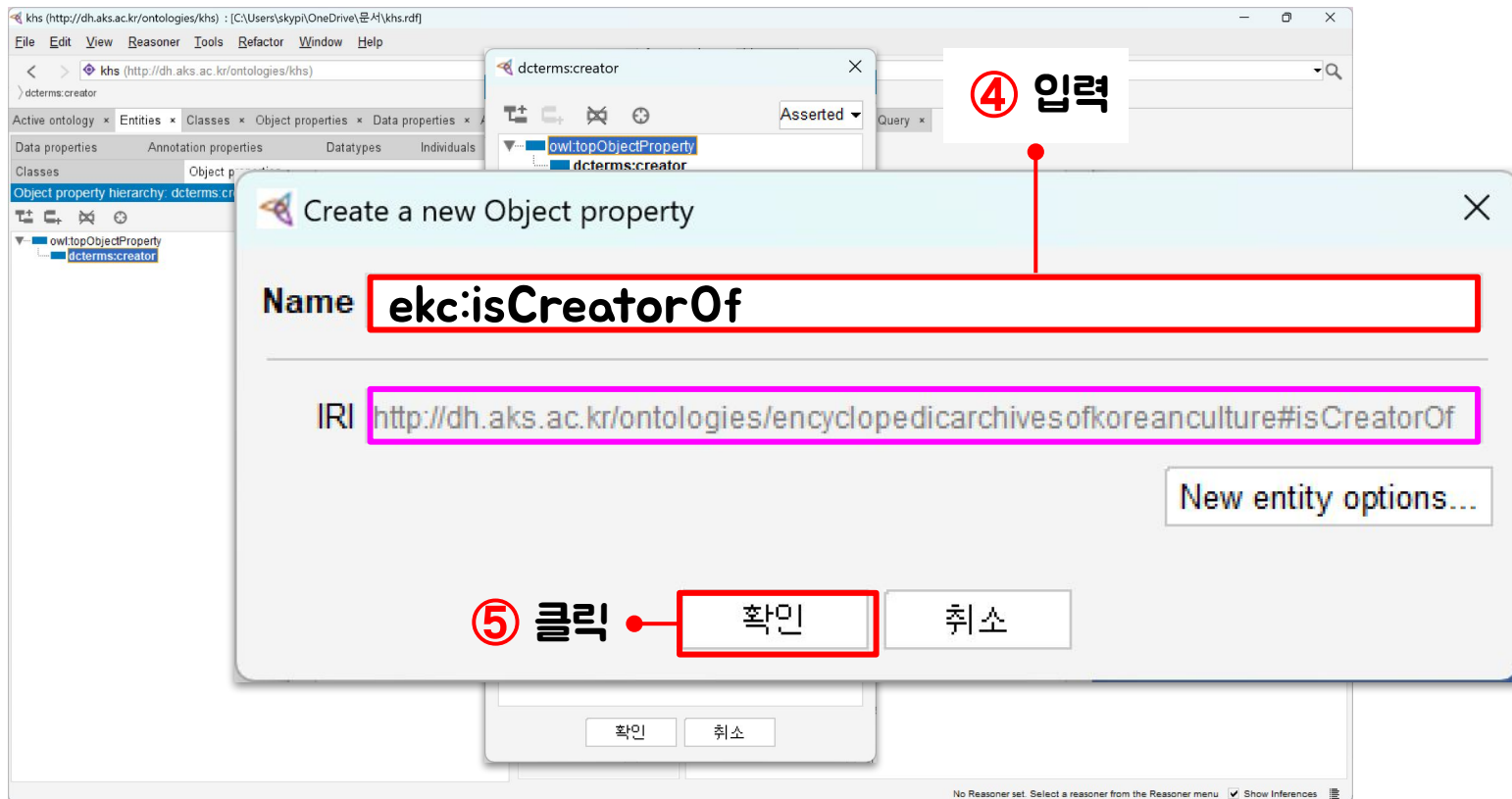
Object properties : 역관계 입력



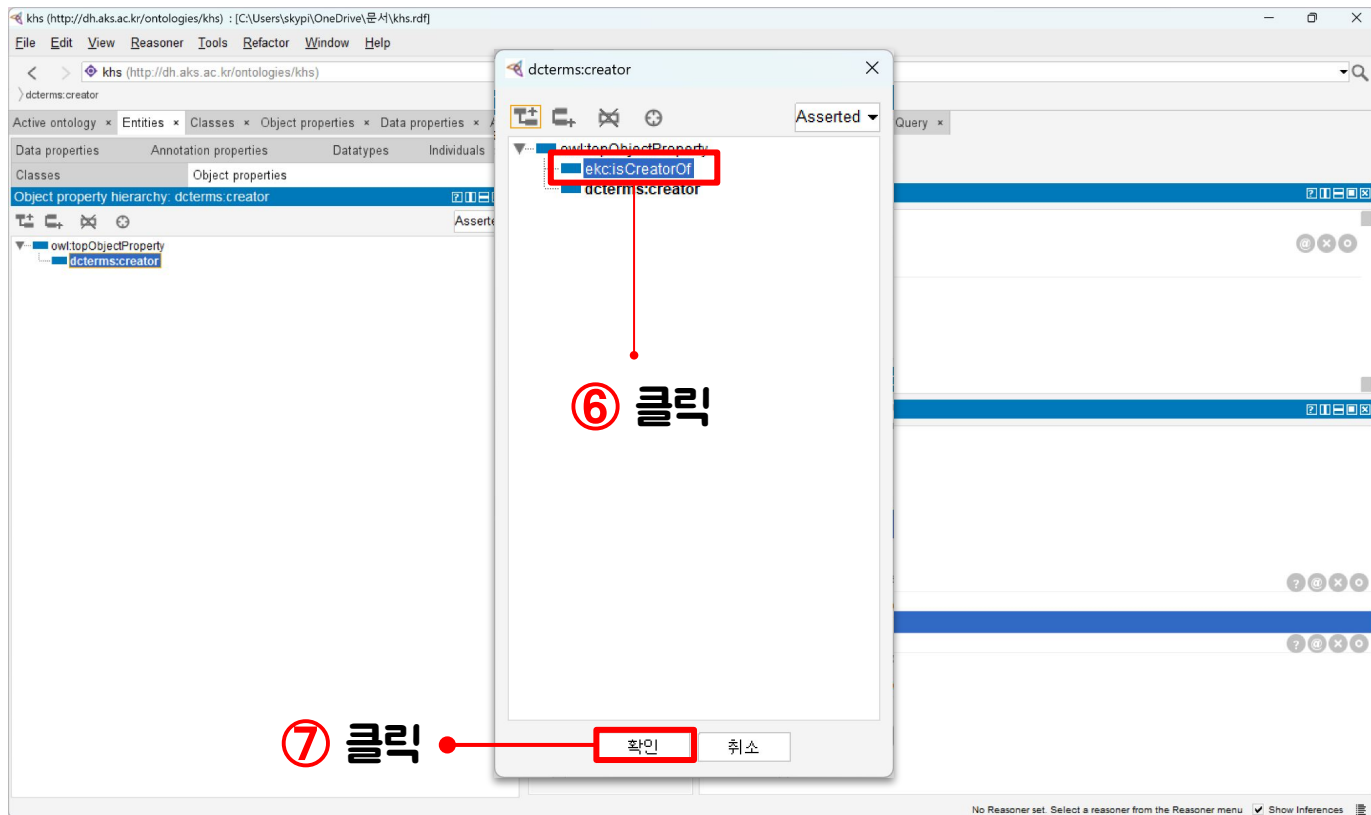
Object properties : 역관계 입력



Object properties : 역관계 입력



Object properties : 역관계 입력



Object properties : 역관계 입력

The screenshot displays the KHS (Knowledge Hierarchy Studio) interface for editing the ontology `khs` (URL: `http://dh.aks.ac.kr/ontologies/khs`). The active ontology is `dterms:creator` (URL: `http://purl.org/dc/terms/creator`).

The left sidebar shows the **Object property hierarchy** for `dterms:creator`, with the `owl:topObjectProperty` expanded to show `ekc:isCreatorOf` and `dterms:creator`.

The main panel shows the **Annotations** and **Usage** tabs for `dterms:creator`. The **Annotations** tab is active, showing the annotation `rdfs:comment` with the value `[language: ko] 창작자`.

The **Characteristics** tab is also visible, showing the **Description** for `dterms:creator`. The **Inverse Of** characteristic is highlighted with a red box, indicating that the property is the inverse of `ekc:isCreatorOf`.

The **Domains** and **Ranges** are also specified:

- Domains (intersection):** `ekc:Object`
- Ranges (intersection):** `ekc:Actor`

The bottom status bar indicates: "No Reasoner set. Select a reasoner from the Reasoner menu" and "Show Inferences".

Object properties : 역관계 입력

The screenshot displays the KHS (Knowledge Hierarchy Studio) interface for editing the ontology 'khs' (http://dh.aks.ac.kr/ontologies/khs). The 'Object properties' tab is active, showing the 'Object property hierarchy' for 'dcterms:creator'. The property 'ekc:isCreatorOf' is selected, and its 'Characteristics' are being configured. A red circle with the number '8' and the Korean text '클릭' (Click) points to the 'ekc:isCreatorOf' property in the list. The 'Description' panel shows the property's characteristics, including 'Equivalent To', 'SubProperty Of', 'Domains (intersection)', 'Ranges (intersection)', 'Disjoint With', and 'SuperProperty Of (Chain)'. The 'Domains (intersection)' and 'Ranges (intersection)' are currently set to 'ekc:Object' and 'ekc:Actor' respectively.

⑧ 클릭

Object property hierarchy: dcterms:creator

Annotations: dcterms:creator

Characteristics: dcterms:creator

ekc:isCreatorOf

Domains (intersection): ekc:Object

Ranges (intersection): ekc:Actor

Object properties : 역관계 입력

khs (http://dh.aks.ac.kr/ontologies/khs) : [C:\Users\skypi\OneDrive\문서\khs.rdf]

File Edit View Reasoner Tools Refactor Window Help

khs (http://dh.aks.ac.kr/ontologies/khs)

ekc:isCreatorOf

Active ontology x Entities x Classes x Object properties x Data properties x Annotation properties x Individuals by class x OntoGraf x SPARQL Query x

Data properties Annotation properties Datatypes Individuals

Classes Object properties

Object property hierarchy: ekc:isCreatorOf

Annotations Usage

Annotations: ekc:isCreatorOf

Annotations +

Characteristics Description: ekc:isCreatorOf

Functional
Inverse functional
Transitive
Symmetric
Asymmetric
Reflexive
Irreflexive

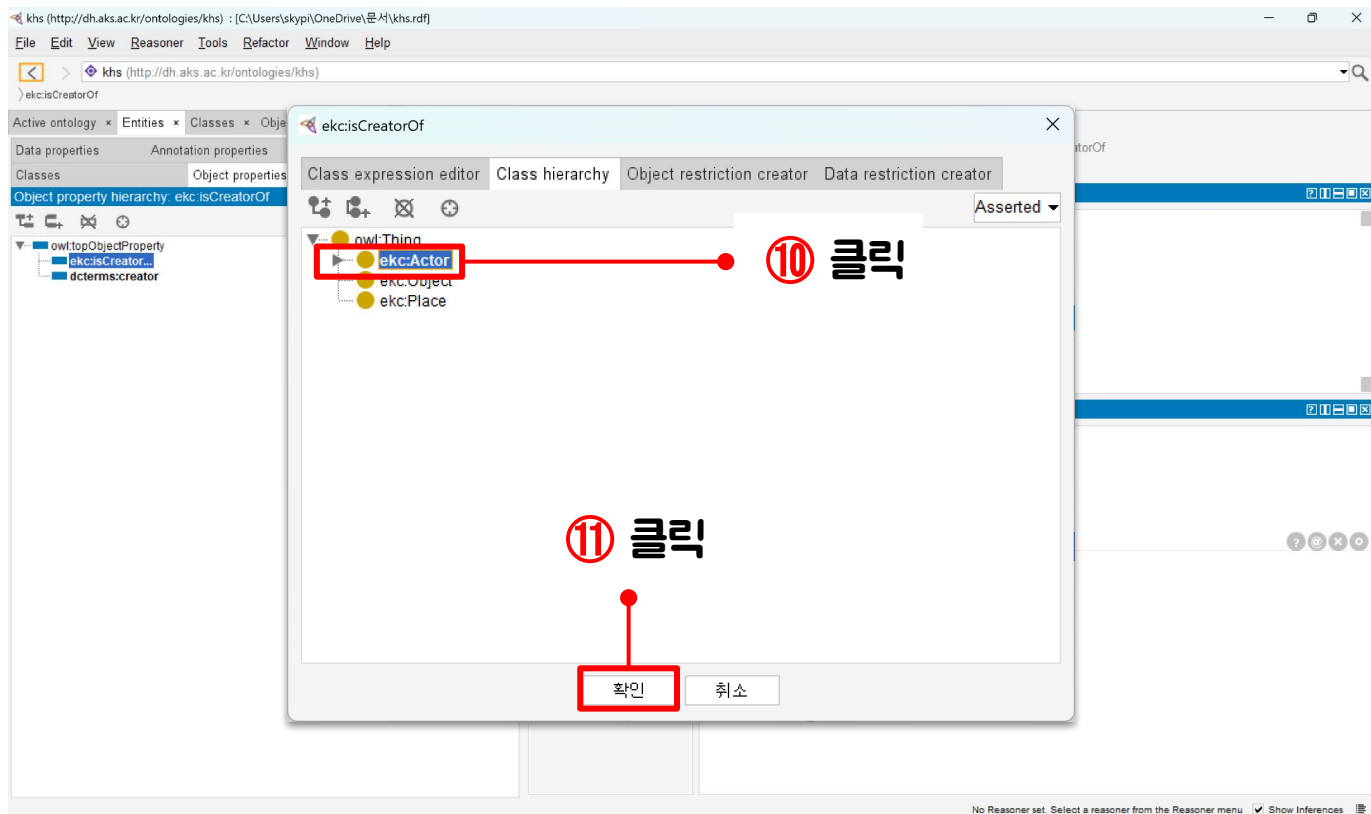
Equivalent To +
SubProperty Of +
Inverse Of +
Domains (intersection) +
Ranges (intersection) +
Disjoint With +
SuperProperty Of (Chain) +

dterms:creator

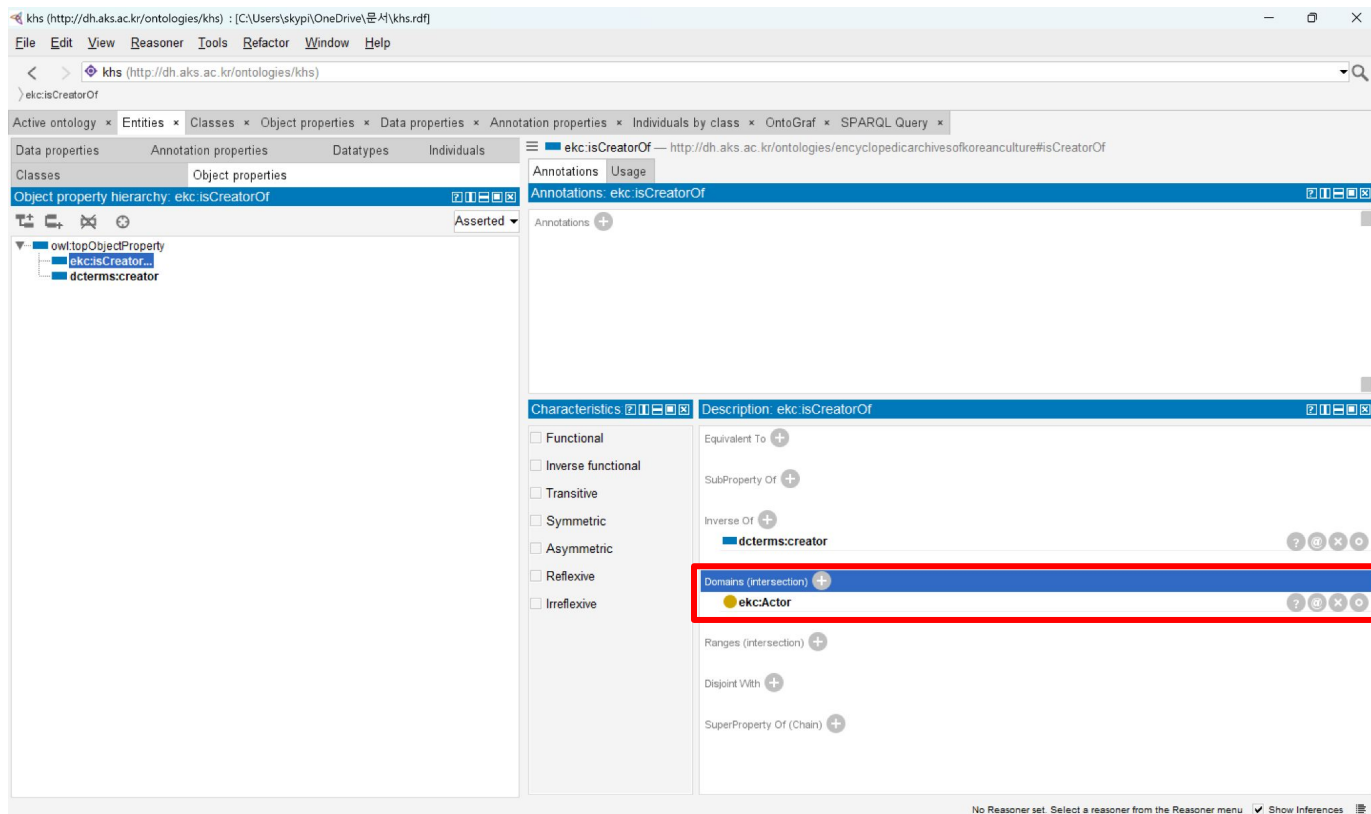
9 클릭

No Reasoner set. Select a reasoner from the Reasoner menu Show Inferences

Object properties : 역관계 입력



Object properties : 역관계 입력

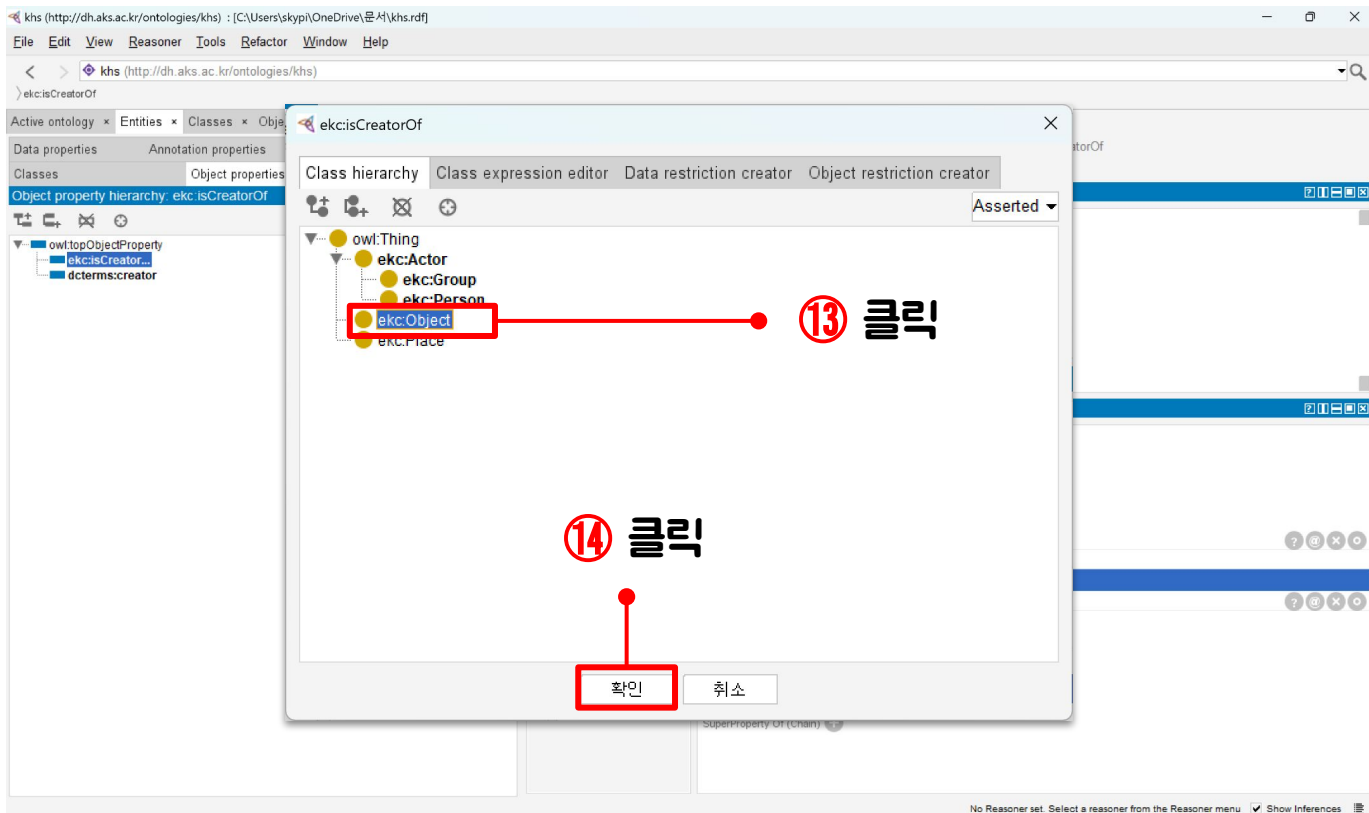


Object properties : 역관계 입력

The screenshot shows the KHS ontology editor interface. The 'Object properties' tab is active, displaying the 'ekc:isCreatorOf' property. The 'Characteristics' panel on the left lists various property constraints, with 'Inverse Of' selected. The 'Description' panel on the right shows the 'Inverse Of' relationship with 'dterms:creator'. A red circle with the number 12 and the Korean text '클릭' (Click) points to the 'Inverse Of' button in the 'Characteristics' panel.

12 클릭

Object properties : 역관계 입력



Object properties : 역관계 입력

The screenshot displays the KHS ontology editor interface. The main window shows the 'ekc:isCreatorOf' property configuration. The left sidebar lists the ontology hierarchy, including 'owl:topObjectProperty', 'ekc:isCreatorOf', and 'dcterms:creator'. The right sidebar shows the 'Annotations: ekc:isCreatorOf' section, which is currently empty. The bottom section, titled 'Characteristics: ekc:isCreatorOf', contains several checkboxes for property characteristics: Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive. The 'Ranges (intersection)' section is highlighted with a red box, showing a list of ranges including 'ekc:Actor' and 'ekc:Object'. The 'ekc:Object' range is currently selected.

Active ontology: khs (http://dh.aks.ac.kr/ontologies/khs) : [C:\Users\skypil\OneDrive\문서\khs.rdf]

File Edit View Reasoner Tools Refactor Window Help

< > khs (http://dh.aks.ac.kr/ontologies/khs)

> ekc:isCreatorOf

Active ontology: khs (http://dh.aks.ac.kr/ontologies/khs) : [C:\Users\skypil\OneDrive\문서\khs.rdf]

File Edit View Reasoner Tools Refactor Window Help

< > khs (http://dh.aks.ac.kr/ontologies/khs)

> ekc:isCreatorOf

Object property hierarchy: ekc:isCreatorOf

Annotations: ekc:isCreatorOf

Annotations: ekc:isCreatorOf

Annotations: +

Characteristics: ekc:isCreatorOf

Description: ekc:isCreatorOf

Equivalent To: +

SubProperty Of: +

Inverse Of: +

Domains (intersection): +

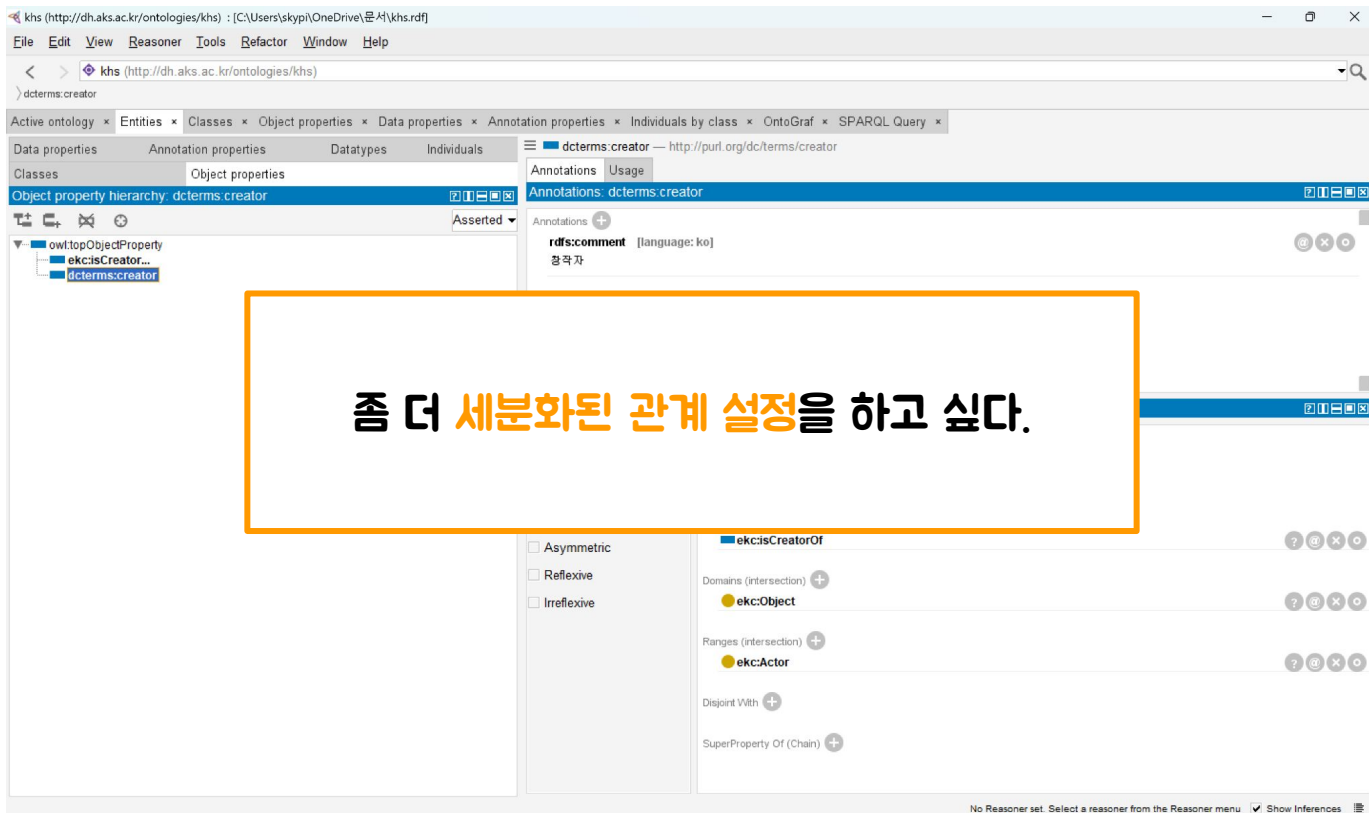
Ranges (intersection): +

Disjoint With: +

SuperProperty Of (Chain): +

No Reasoner set. Select a reasoner from the Reasoner menu. Show Inferences

Object properties : 관계 세분화



Object property hierarchy: dcterms:creator

Annotations: dcterms:creator

Annotations: +

rdfs:comment [language: ko]
제작자

ekc:isCreatorOf

Domains (intersection) +
● ekc:Object

Ranges (intersection) +
● ekc:Actor

Disjoint With +

SuperProperty Of (Chain) +

☐ Asymmetric
☐ Reflexive
☐ Irreflexive

No Reasoner set. Select a reasoner from the Reasoner menu ☒ Show Inferences

좀 더 세분화된 관계 설정을 하고 싶다.

Object properties : 관계 세분화

① 클릭

The screenshot displays the KHS (Knowledge Hierarchy Studio) interface. The main window is titled 'khs (http://dh.aks.ac.kr/ontologies/khs)'. The left sidebar shows the 'Object properties' tab selected, with a tree view under 'Object property hierarchy: dterms:creator'. A red box highlights the 'dterms:creator' property, and a red arrow points to it from the text '① 클릭' (Click 1). The right pane shows the 'Annotations' tab for 'dterms:creator', with a list of annotations including 'rdfs:comment [language: ko] 창작자'. Below this, the 'Characteristics' tab is active, showing various property characteristics like 'Functional', 'Inverse functional', 'Transitive', etc. The 'Description' tab is also visible, showing the property's domain and range.

Active ontology: khs (http://dh.aks.ac.kr/ontologies/khs)

File Edit View Reasoner Tools Refactor Window Help

< > khs (http://dh.aks.ac.kr/ontologies/khs)

> dterms:creator

Active ontology: khs (http://dh.aks.ac.kr/ontologies/khs)

Entities: Classes, Object properties, Data properties, Annotation properties, Individuals by class, OntoGraf, SPARQL Query

Data properties, Annotation properties, Datatypes, Individuals

Classes, Object properties

Object property hierarchy: dterms:creator

Annotations Usage

Annotations: dterms:creator

Annotations: +

rdfs:comment [language: ko]
창작자

Characteristics: +

Description: dterms:creator

Equivalent To: +

SubProperty Of: +

Inverse Of: +

Domains (intersection): +

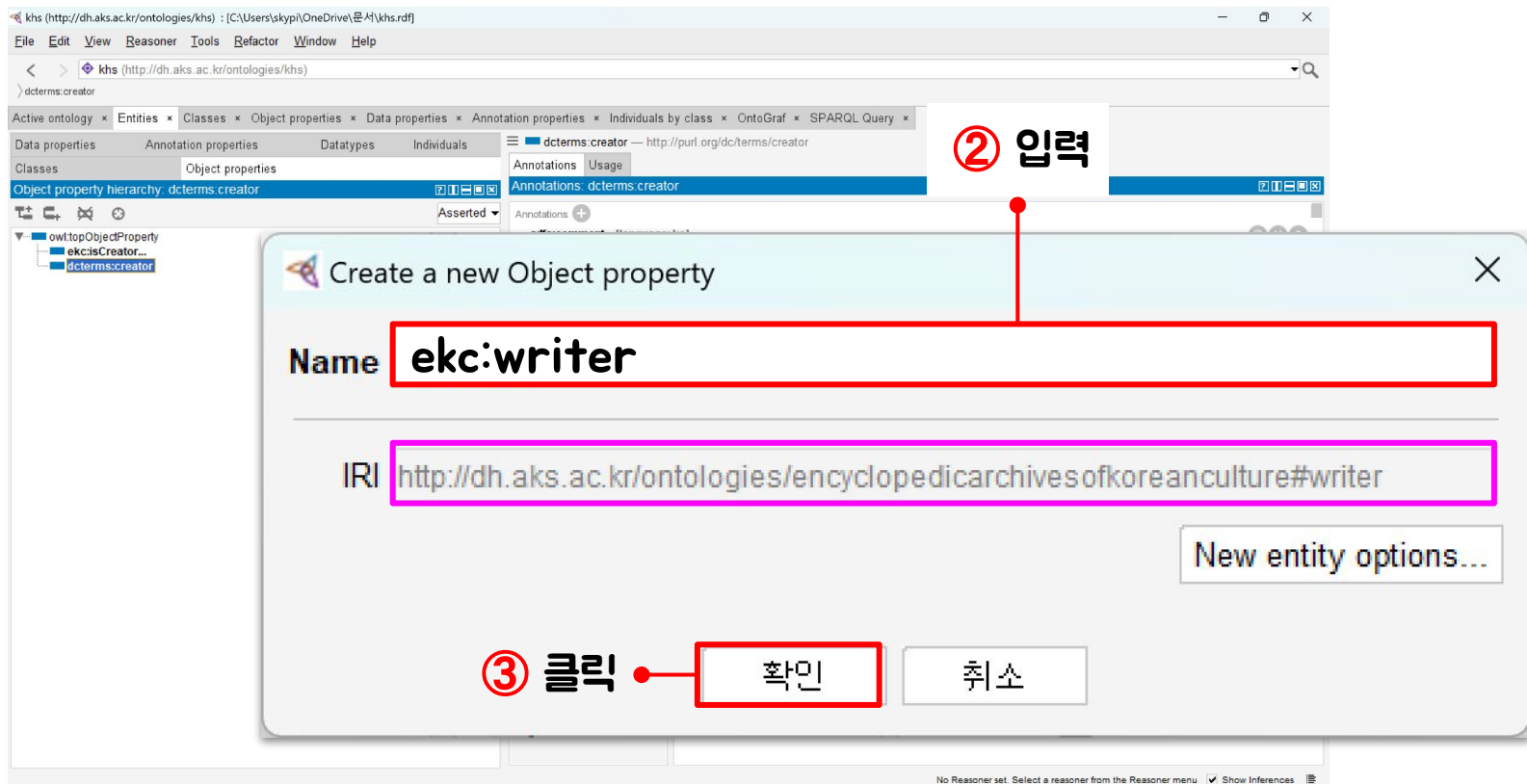
Ranges (intersection): +

Disjoint With: +

SuperProperty Of (Chain): +

No Reasoner set. Select a reasoner from the Reasoner menu. Show Inferences

Object properties : 관계 세분화



Object properties : 관계 세분화

The screenshot displays the KHS web application interface for editing the ontology 'dterms:creator'. The left sidebar, titled 'Object property hierarchy: dterms:creator', shows a tree structure where 'dterms:creator' is selected under 'owl:topObjectProperty'. The main area is divided into several panels:

- Annotations:** Shows a single annotation: `rdfs:comment` with the value `[language: ko]` and the Korean text '제작자' (Creator).
- Characteristics:** A list of checkboxes for property characteristics: Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive. All are currently unchecked.
- Description:** A panel for defining the property's semantics, including fields for:
 - Equivalent To
 - SubProperty Of
 - Inverse Of (set to `ekc:isCreatorOf`)
 - Domains (intersection) (set to `ekc:Object`)
 - Ranges (intersection) (set to `ekc:Actor`)
 - Disjoint With
 - SuperProperty Of (Chain)

A red rectangle highlights the left sidebar and the top part of the main area, indicating the focus on the object property configuration.

Object properties : 관계 세분화

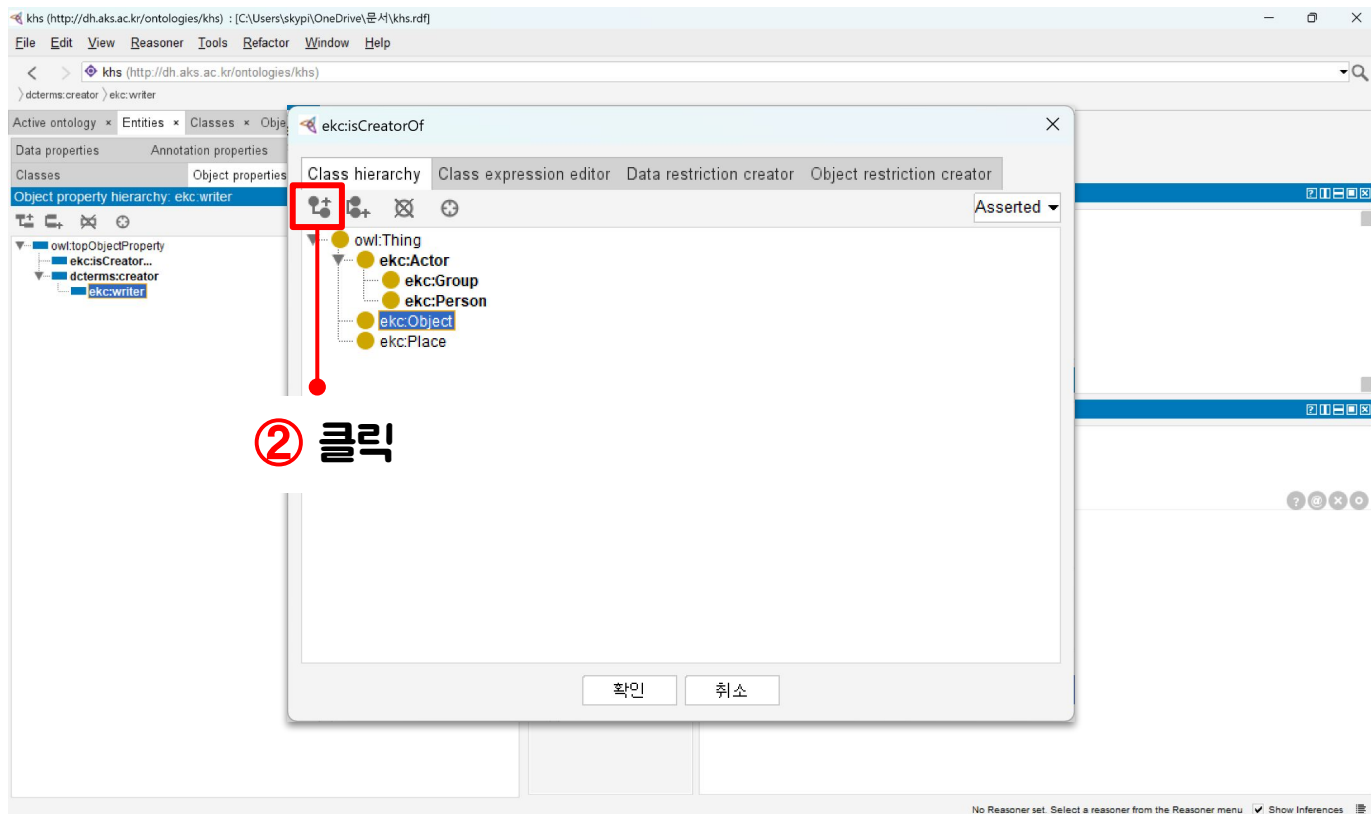
The screenshot displays the KHS interface for editing the ontology `khs` (http://dh.aks.ac.kr/ontologies/khs). The left sidebar shows the 'Object property hierarchy' for `ekc:writer`, which is a subclass of `owl:topObjectProperty`. The main area is divided into two panels: 'Characteristics' and 'Description'.

Characteristics Panel: This panel lists various properties that can be applied to the object property. The 'Reflexive' checkbox is highlighted with a red circle and the number '1', with a red arrow pointing to it from the Korean text '클릭' (click).

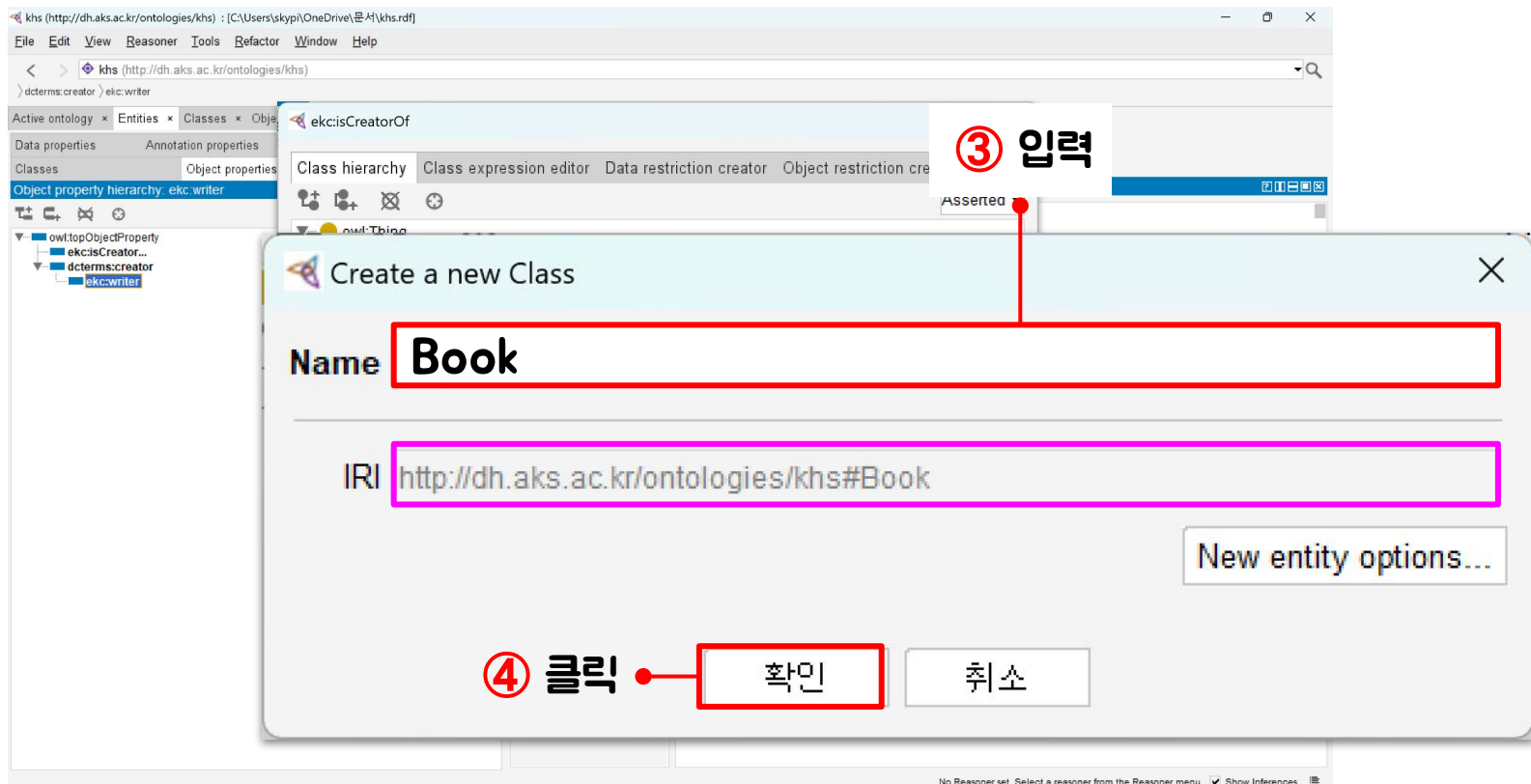
Description Panel: This panel shows the 'Domains (intersection)' button, which is highlighted with a red rectangle. Other buttons visible include 'Equivalent To', 'SubProperty Of', 'Inverse Of', 'Ranges (intersection)', 'Disjoint With', and 'SuperProperty Of (Chain)'.

The bottom status bar indicates 'No Reasoner set. Select a reasoner from the Reasoner menu' and 'Show Inferences'.

Object properties : 관계 세분화



Object properties : 관계 세분화



Object properties : 관계 세분화

The screenshot shows the KHS ontology editor interface. The main window displays the 'Object restriction creator' dialog box. The dialog has tabs for 'Class expression editor', 'Class hierarchy', 'Object restriction creator', and 'Data restriction creator'. The 'Object restriction creator' tab is active, showing a class hierarchy tree. The tree starts with 'owl:Thing' at the root, followed by 'ekc:Actor', 'ekc:Object', 'khs:Book', and 'ekc:Place'. The 'khs:Book' class is highlighted. At the bottom of the dialog, there is a red circle with the number '5' and the Korean text '클릭' (Click), which points to the '확인' (Confirm) button. The '확인' button is highlighted with a red rectangle. The '취소' (Cancel) button is also visible next to it.

⑤ 클릭

확인 취소

Object properties : 관계 세분화

The screenshot displays the KHS (Knowledge Hierarchy System) interface for editing the ontology `khs` (http://dh.aks.ac.kr/ontologies/khs). The left sidebar shows the ontology structure with `owl:topObjectProperty` expanded, containing `ekc:isCreator` and `dterms:creator`. The main panel is titled `Object property hierarchy: ekc:writer` and shows the `ekc:writer` property being edited. The `Annotations` tab is active, showing a list of annotations. The `Characteristics` tab is also visible, showing various property characteristics like `Functional`, `Inverse functional`, etc. The `Description: ekc:writer` panel on the right shows the property's domain and range. The domain is set to `khs:Book`, which is highlighted with a red rectangle. The range is currently empty.

Active ontology: `khs` (http://dh.aks.ac.kr/ontologies/khs)

Object property hierarchy: `ekc:writer`

Annotations: `ekc:writer`

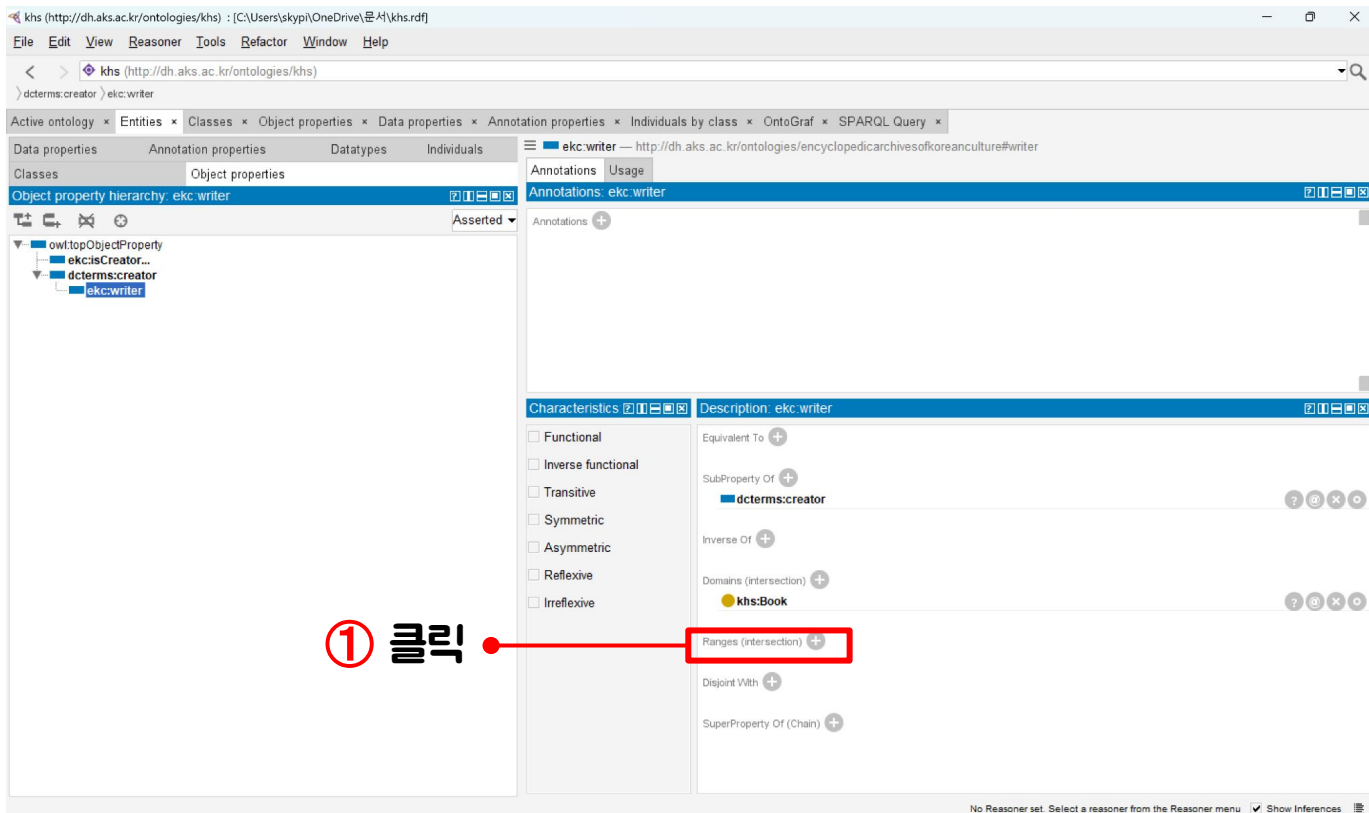
Characteristics: `ekc:writer`

Description: `ekc:writer`

Domains (intersection): `khs:Book`

Ranges (intersection):

Object properties : 관계 세분화



The screenshot displays the KHS (Knowledge Hierarchy System) interface, specifically the configuration page for the 'ekc:writer' object property. The interface is divided into several panels:

- Object property hierarchy:** Shows the hierarchy of properties, with 'ekc:writer' selected under 'dcterms:creator'.
- Annotations:** Shows the 'ekc:writer' property.
- Characteristics:** Lists various characteristics for the property, including Functional, Inverse functional, Transitive, Symmetric, Asymmetric, Reflexive, and Irreflexive.
- Description:** Shows the 'ekc:writer' property's description, including its domain and range.

A red circle with the number '1' and the Korean text '클릭' (Click) points to the 'Ranges (intersection)' button in the 'Description' panel, indicating where to click to configure the range of the property.

Object properties : 관계 세분화

The screenshot shows the KHS ontology editor interface. The main window displays the 'Object restriction creator' dialog box. The dialog box has a tabbed interface with 'Class hierarchy' selected. The class hierarchy shows a tree structure with 'ekc:Actor' highlighted. A red box and arrow point to 'ekc:Actor' with the annotation '② 클릭'. At the bottom of the dialog box, a red box and arrow point to the '확인' (Confirm) button with the annotation '③ 클릭'. The '확인' button is next to a '취소' (Cancel) button. The background shows the ontology editor's main window with a menu bar and a sidebar.

Object properties : 관계 세분화

The screenshot displays the KHS (Knowledge Hierarchy System) interface for editing the ontology `khs` (URL: `http://dh.aks.ac.kr/ontologies/khs`). The main window is titled `ekc:writer` and shows the `Object properties` tab. The `Object property hierarchy` for `ekc:writer` is shown on the left, with `ekc:writer` selected under `dterms:creator`. The `Annotations` tab is active, showing a list of annotations for `ekc:writer`. The `Characteristics` tab is also visible, showing the following properties:

- ☐ Functional
- ☐ Inverse functional
- ☐ Transitive
- ☐ Symmetric
- ☐ Asymmetric
- ☐ Reflexive
- ☐ Irreflexive

The `Description` tab for `ekc:writer` is also visible, showing the following characteristics:

- Equivalent To: `+`
- SubProperty Of: `dterms:creator`
- Inverse Of: `+`
- Domains (intersection): `khs:Book`
- Ranges (intersection): `ekc:Actor`
- Disjoint With: `+`
- SuperProperty Of (Chain): `+`

The status bar at the bottom indicates: "No Reasoner set. Select a reasoner from the Reasoner menu" and "Show Inferences".

6

프로테제 실습 - Data properties

Data properties : 데이터 속성값 입력

① 클릭

② 입력

Create a new Data property

Name **dcterms:Title**

IRI **http://purl.org/dc/terms/Title**

New entity options...

③ 클릭

확인 취소

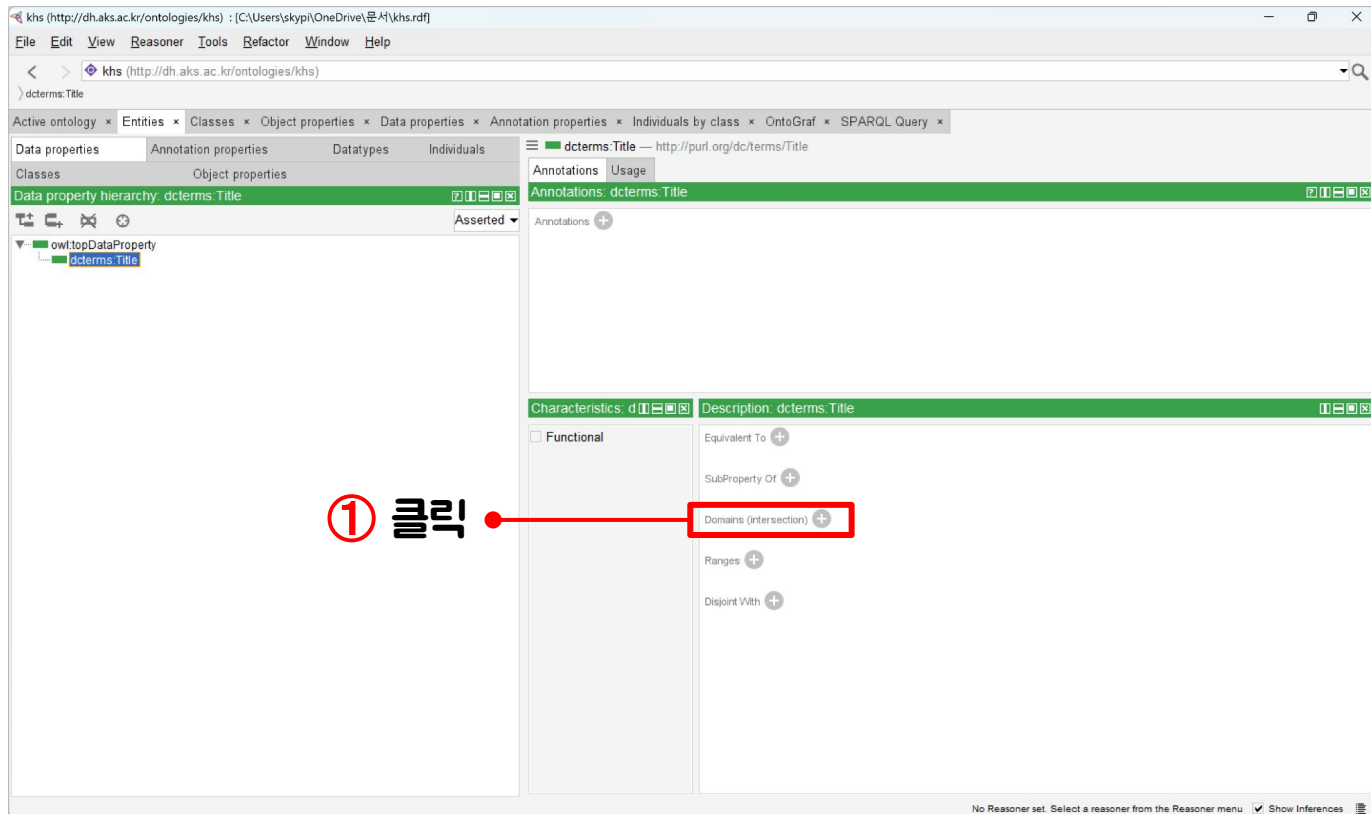
Data properties : 데이터 속성값 입력

The screenshot displays the KHS (Knowledge Hierarchy System) interface for editing the ontology `khs` (located at `http://dh.aks.ac.kr/ontologies/khs`). The interface is divided into several panes:

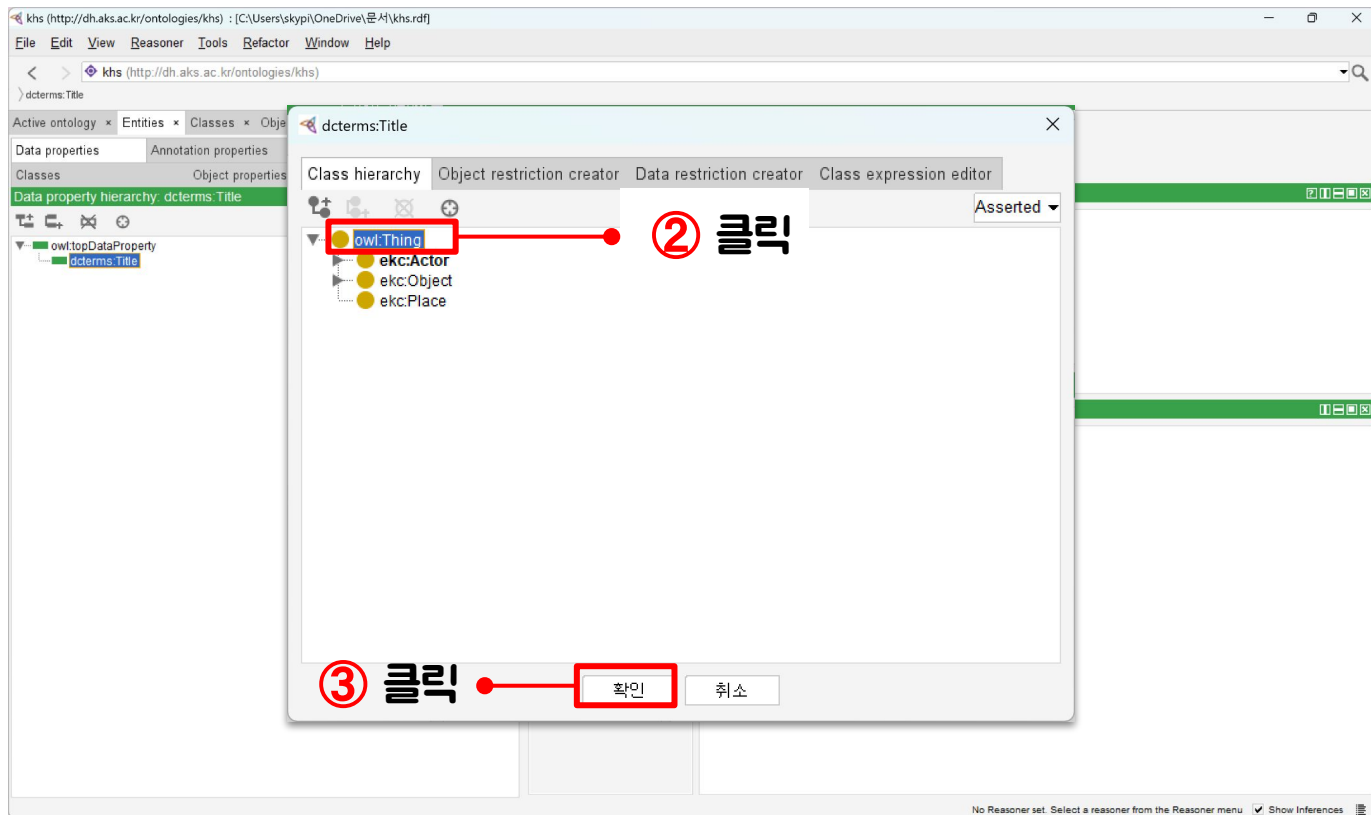
- Top Bar:** Contains the menu (File, Edit, View, Reasoner, Tools, Refactor, Window, Help) and the current ontology name `khs`.
- Left Pane:** Shows the ontology structure with tabs for `Active ontology`, `Entities`, `Classes`, `Object properties`, `Data properties`, `Annotation properties`, `Individuals by class`, `OntoGraf`, and `SPARQL Query`. The `Data properties` tab is selected, showing a hierarchy where `owl:topDataProperty` is the parent and `dterms:Title` is the child. This entire pane is highlighted with a red rectangle.
- Right Pane:** Contains two main sections:
 - Annotations:** A tabbed interface with `Annotations` and `Usage` tabs. The `Annotations` tab is active, showing a list of annotations for `dterms:Title`.
 - Characteristics:** A section for defining the characteristics of the data property. It includes a `Functional` checkbox and a list of characteristics with plus icons for adding new ones:
 - Equivalent To
 - SubProperty Of
 - Domains (intersection)
 - Ranges
 - Disjoint With

The status bar at the bottom indicates "No Reasoner set. Select a reasoner from the Reasoner menu" and a checkbox for "Show Inferences".

Data properties : 데이터 속성값 입력



Data properties : 데이터 속성값 입력



Data properties : 데이터 속성값 입력

The screenshot displays the KHS (Knowledge Hierarchy System) interface for editing the 'dcterms:Title' data property. The interface is divided into several panels:

- Left Panel:** Shows the 'Data property hierarchy' for 'dcterms:Title'. It indicates that 'dcterms:Title' is an 'owl:topDataProperty'.
- Top Panel:** Contains the 'Active ontology' (khs) and a list of tabs including 'Entities', 'Classes', 'Object properties', 'Data properties', 'Annotation properties', 'Individuals by class', 'OntoGraf', and 'SPARQL Query'.
- Center Panel:** Displays the 'Data property hierarchy' for 'dcterms:Title' and the 'Annotations' for 'dcterms:Title'. The 'Annotations' tab is currently selected, showing a list of annotations.
- Right Panel:** Shows the 'Description' for 'dcterms:Title'. It includes a 'Functional' checkbox (unchecked) and a 'Domain (intersection)' section. The domain is currently set to 'owl:Thing', which is highlighted with a red box. Other options like 'Equivalent To', 'SubProperty Of', 'Ranges', and 'Disjoint With' are also visible.

The status bar at the bottom indicates 'No Reasoner set. Select a reasoner from the Reasoner menu' and 'Show Inferences'.

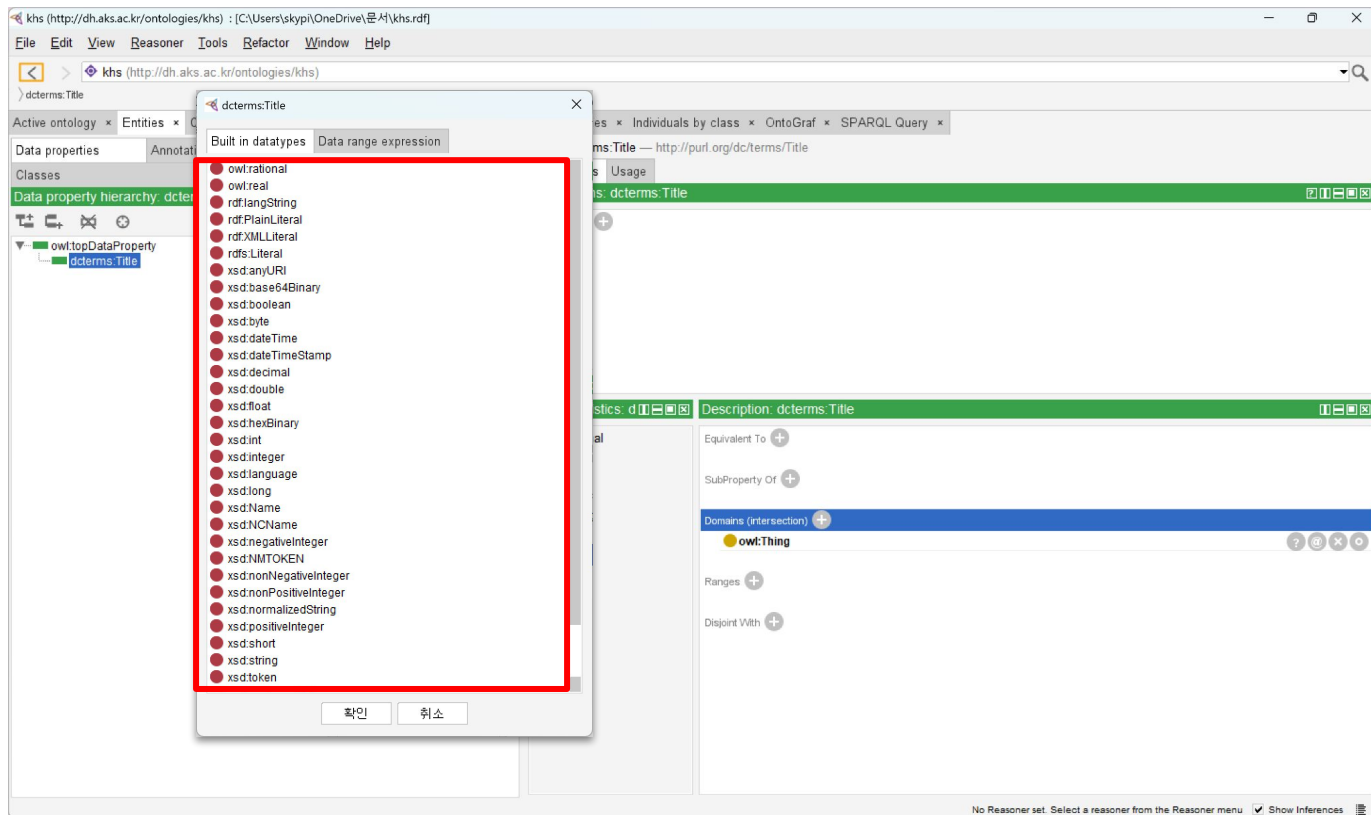
Data properties : 데이터 속성값 입력

The screenshot displays the KHS (Knowledge Hierarchy Studio) interface for editing the ontology `khs` (located at `http://dh.aks.ac.kr/ontologies/khs`). The left sidebar shows the `Data property hierarchy` for `dterms`, with `owl:topDataProperty` expanded to show `dterms:Title`. The main workspace is divided into several panels:

- Annotations:** Shows the `Annotations` tab for `dterms:Title`, currently empty.
- Characteristics:** Contains a `Functional` checkbox and a `Ranges` button, which is highlighted with a red box and a red arrow pointing to it from the text "① 클릭".
- Description:** Shows the `Description` for `dterms:Title`, including an `Equivalent To` field, a `SubProperty Of` field, and a `Domain (intersection)` field set to `owl:Thing`.

The bottom status bar indicates "No Reasoner set. Select a reasoner from the Reasoner menu" and a checkbox for "Show Inferences".

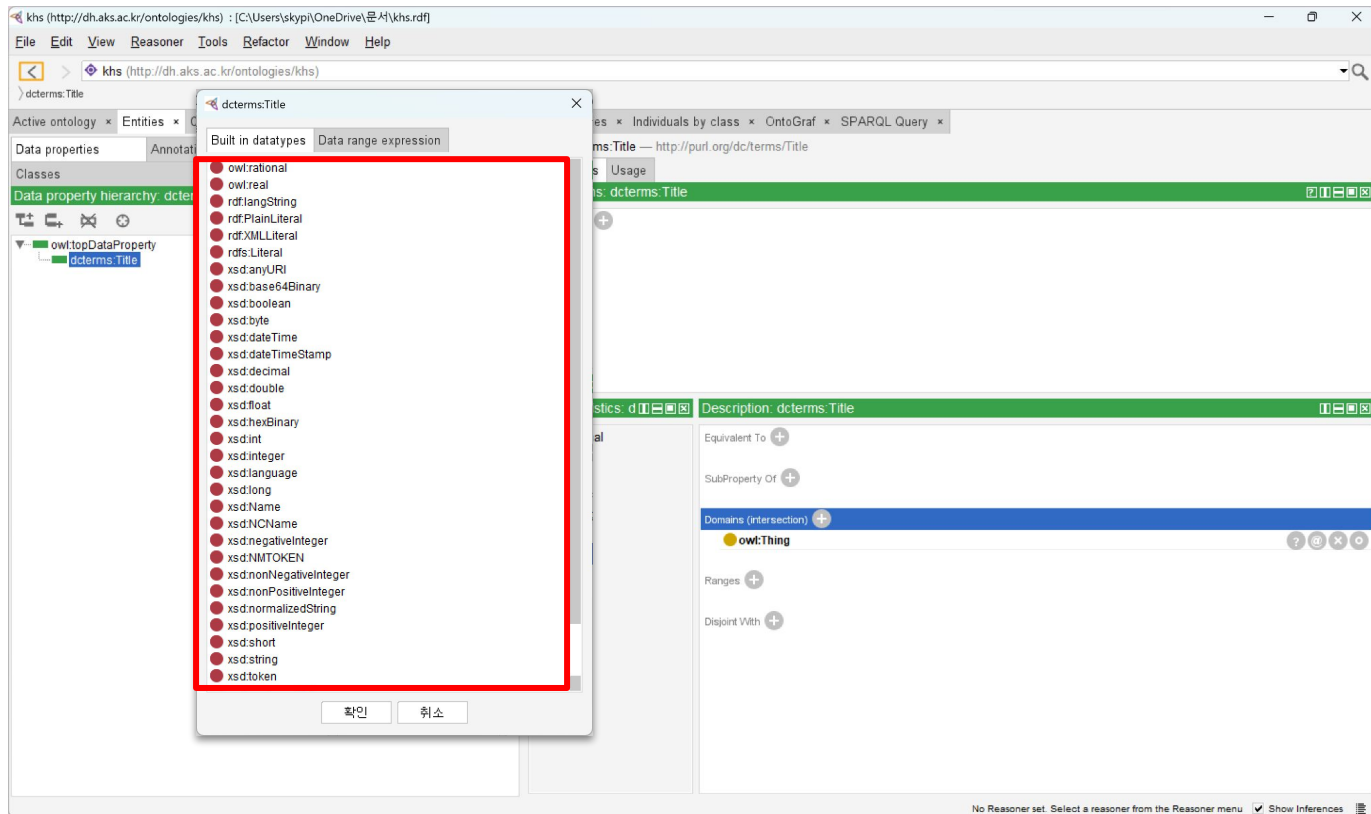
Data properties : 데이터 속성값 입력



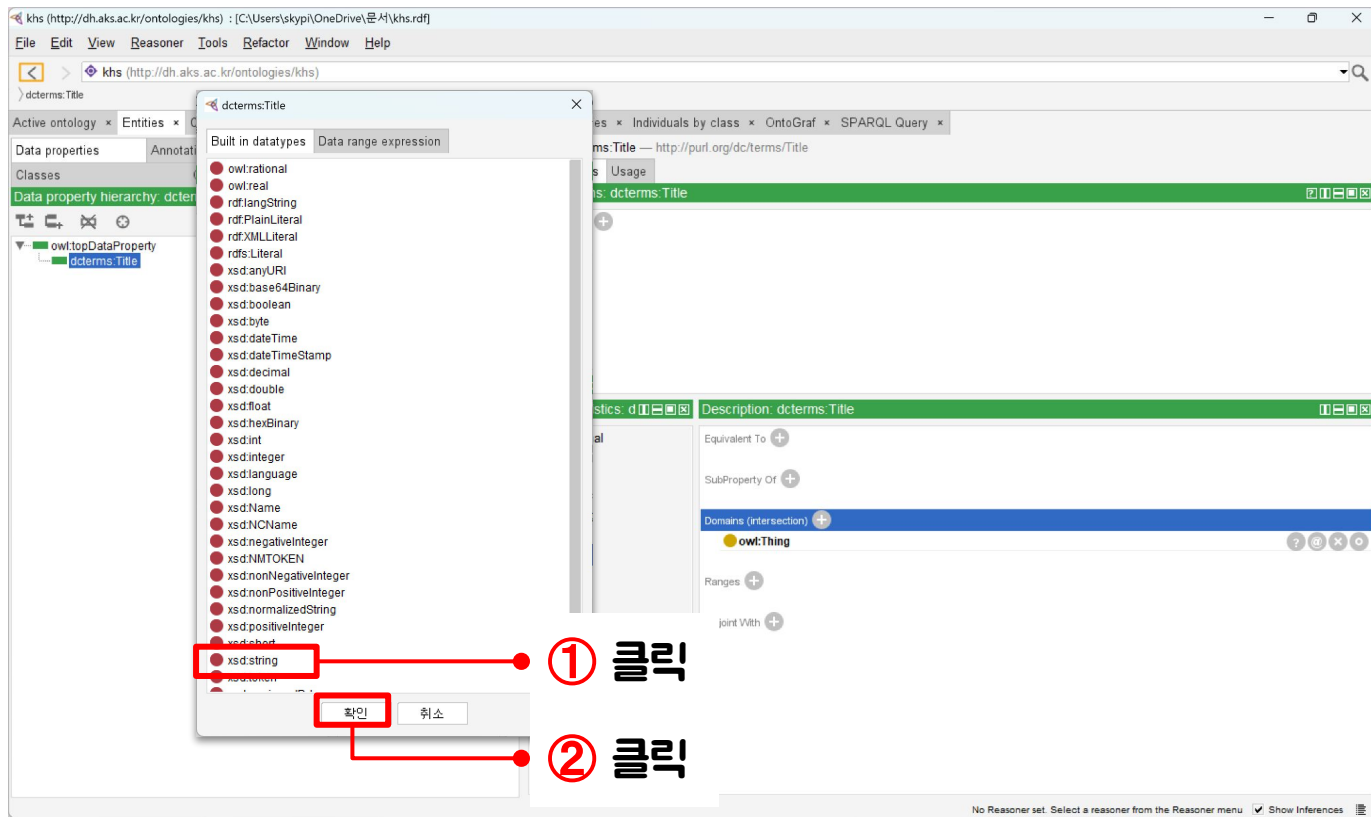
※ Data Types

데이터 유형	설명
<code>rdfs:Literal</code>	문자
<code>xsd:float</code>	실수
<code>xsd:dateTime</code>	날짜
<code>xsd:int</code> / <code>xsd:integer</code>	숫자
<code>xsd:string</code>	문자
<code>xsd:anyURI</code>	다른 곳의 고유한 id 값을 사용 할 때 연결시키기 위해 사용

Data properties : 데이터 속성값 입력



Data properties : 데이터 속성값 입력



Data properties : 데이터 속성값 입력

The screenshot displays the KHS (Knowledge Hierarchy System) interface, which is used for managing ontologies. The main window shows the configuration for a data property named `dterms:Title`.

Left Panel: The "Data property hierarchy: dterms:Title" view shows the property `dterms:Title` under the `owl:topDataProperty` category.

Right Panel: The "Description: dterms:Title" view shows the configuration for the property. The "Ranges" section is highlighted with a red box, indicating the data type `xsd:string` is assigned to the property.

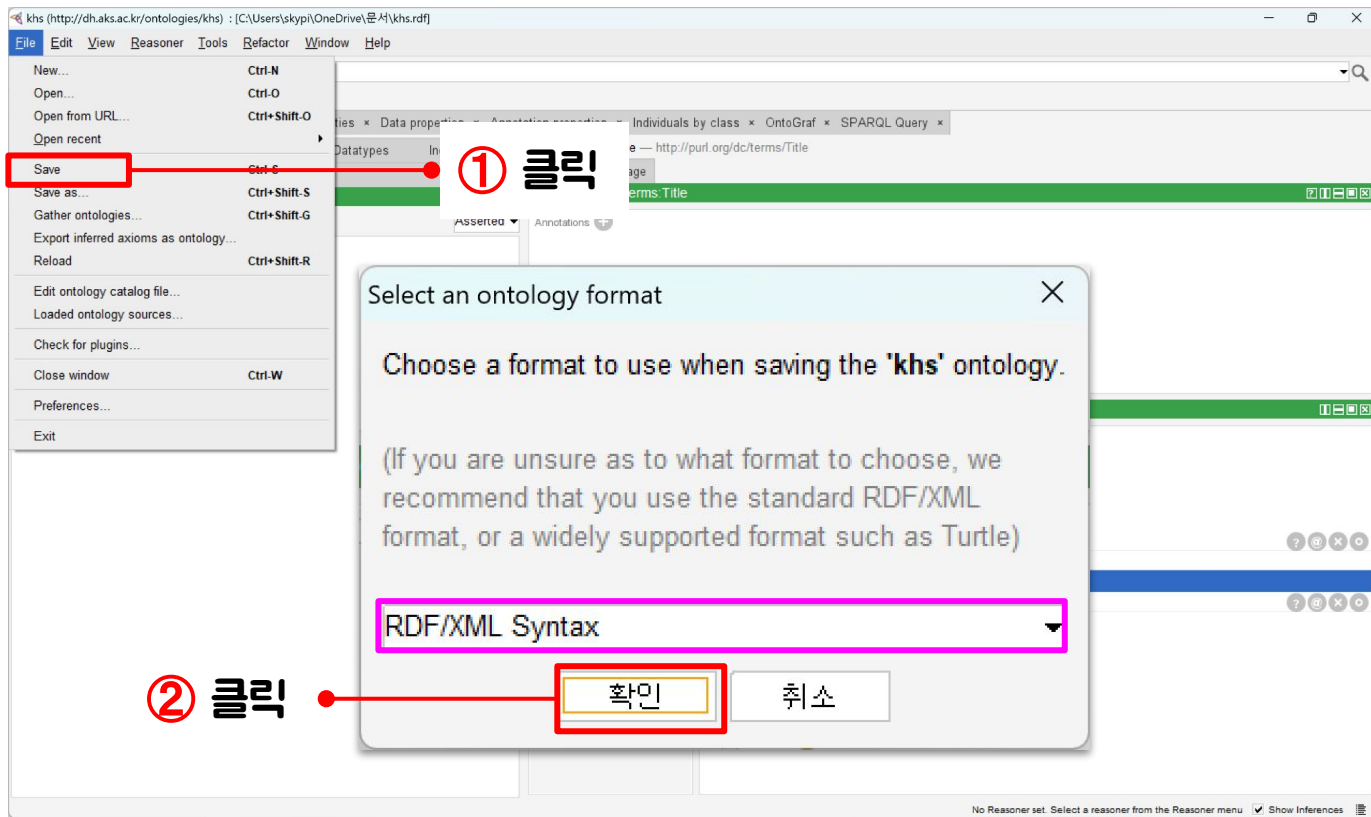
Bottom Panel: The "Characteristics: dterms:Title" view shows the property's characteristics, including "Functional" (checked), "Equivalent To", "SubProperty Of", "Domains (intersection)" (set to `owl:Thing`), and "Disjoint With".

The status bar at the bottom indicates "No Reasoner set. Select a reasoner from the Reasoner menu" and "Show Inferences".

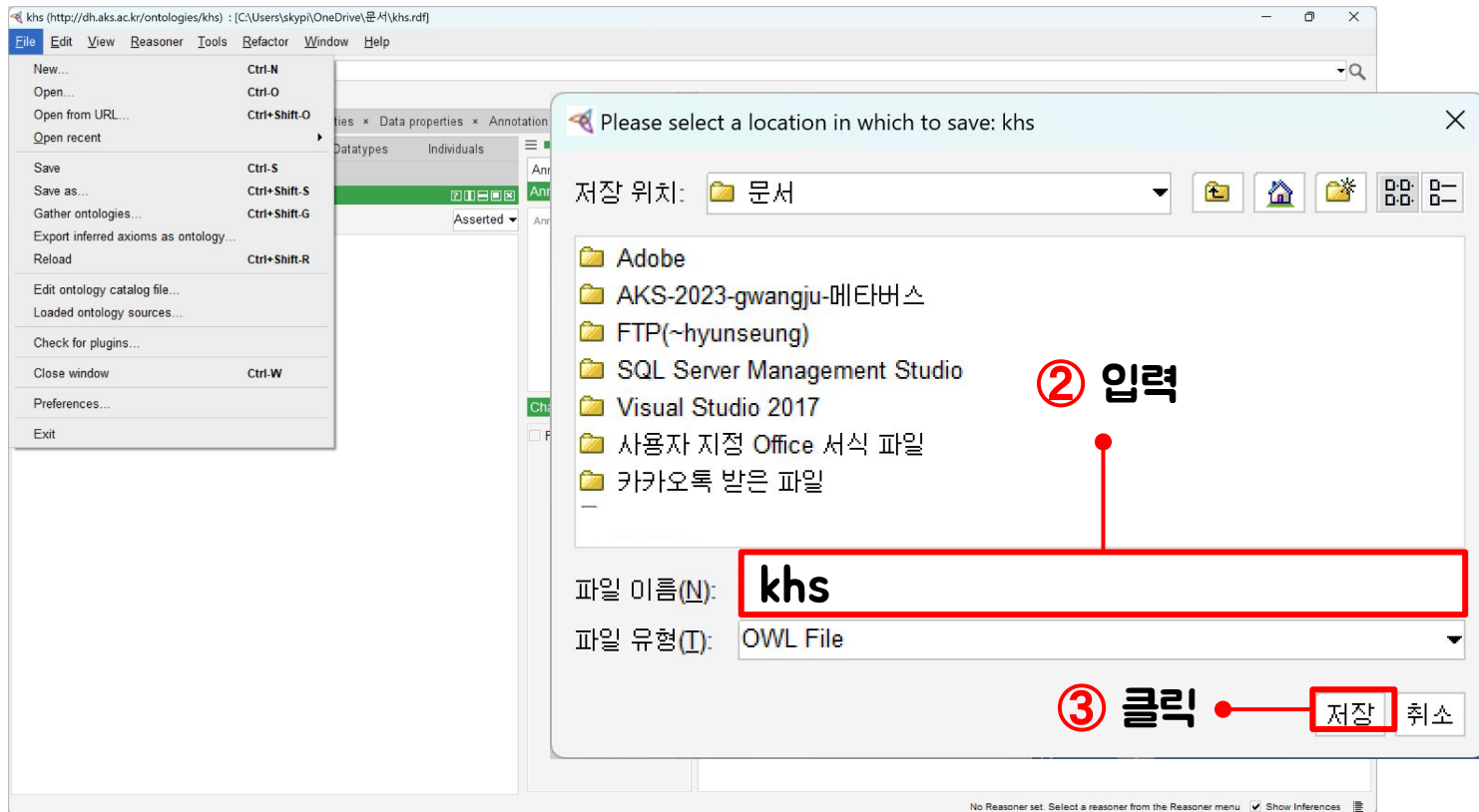
7

프로테제 실습 - 마무리

마무리 : 파일 저장



마무리 : 파일 저장

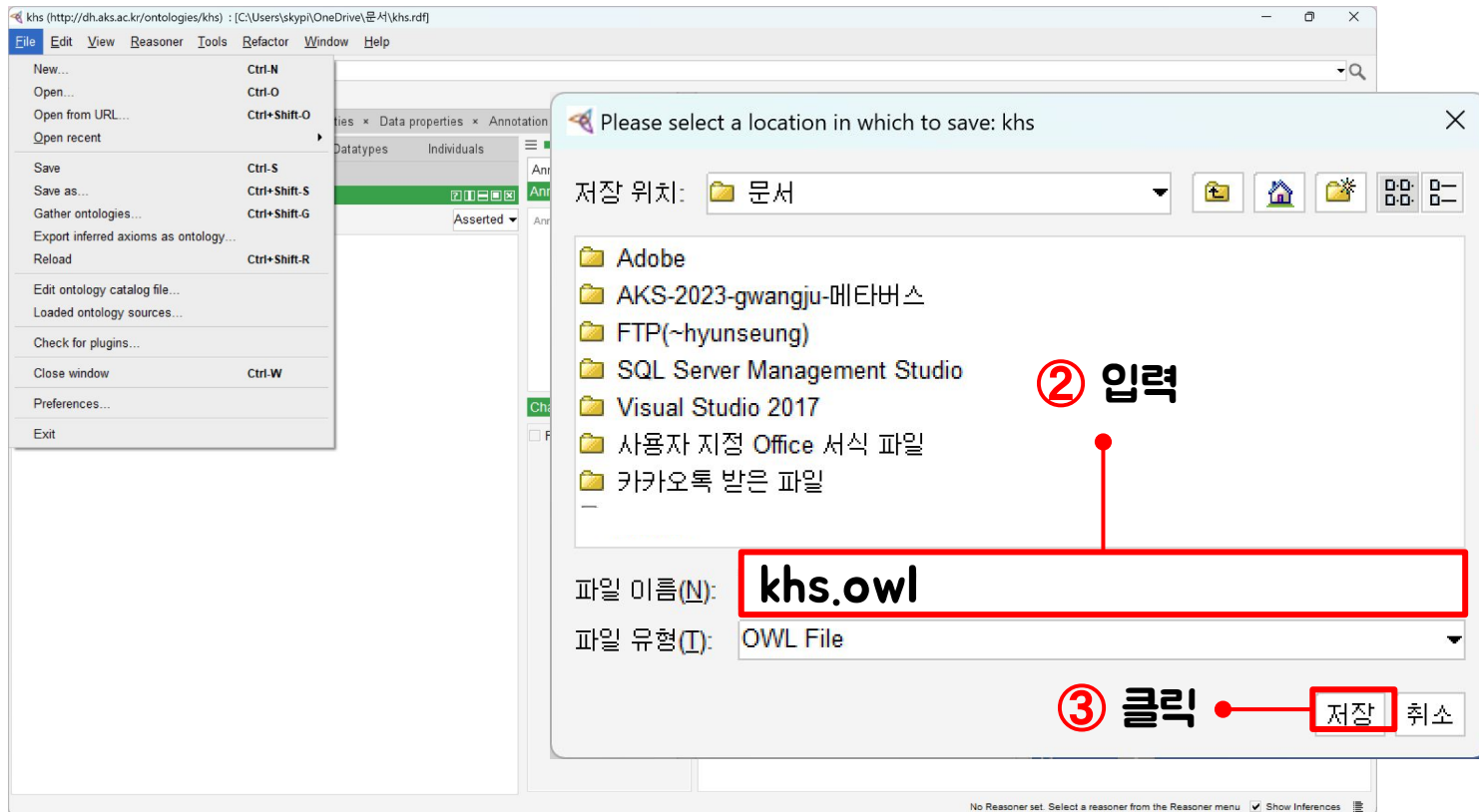


마무리 : 파일 저장



✓ khs.rdf

마무리 : 파일 저장



마무리 : 파일 저장



✓ khs.owl

※ 프로그램 다운로드



❖ 노트패드++(Notepad++)

: 문서 편집기이자 소스 코드 편집기



❖ 파일질라(FileZilla)

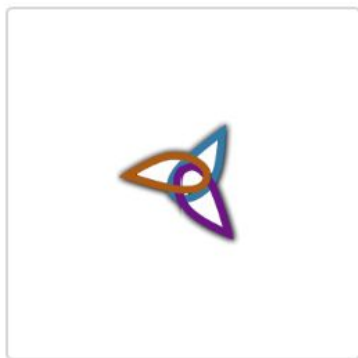
: 서버 및 클라이언트 양자 사이의 FTP
프로토콜에 의한 파일 전송을 지원하는
소프트웨어

※ 프로그램 다운로드

실습 도구 [편집]

- [Protege v5.6.4 for Windows 다운로드](#)
- [Notepad++ v8.7 for Windows 다운로드](#)
- [FileZilla Client v3.67 for Windows 다운로드](#)
- [FileZilla 사용법](#)

마무리 : 메모장으로 파일 열어보기



✓ khs.owl



마무리 : 메모장으로 파일 열어보기

```
1 <?xml version="1.0"?>
2 <rdf:RDF xmlns="http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/"
3   xml:base="http://www.semanticweb.org/skypi/ontologies/2024/9/untitled-ontology-9/"
4   xmlns:ekc="http://dh.aks.ac.kr/ontologies/encyclopediaofkoreanculture#"
5   xmlns:khs="http://dh.aks.ac.kr/ontologies/khs#"
6   xmlns:owl="http://www.w3.org/2002/07/owl#"
7   xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
8   xmlns:xml="http://www.w3.org/XML/1998/namespace"
9   xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
10  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
11  xmlns:dcterms="http://purl.org/dc/terms#">
12   <owl:Ontology rdf:about="http://dh.aks.ac.kr/ontologies/khs">
13     <rdfs:comment xml:lang="ko">김현승이 2024년에 만든 디지털유산프로젝트 수업 실습 온톨로지이다.
14     </rdfs:comment>
15   </owl:Ontology>
```

마무리 : 메모장으로 파일 열어보기

```
17
18 <!--
19 //////////////////////////////////////
20 //
21 // Object Properties
22 //
23 //////////////////////////////////////
24 -->
25
26
27
28
29 <!-- http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#isCreatorOf -->
30
31 <owl:ObjectProperty rdf:about=
32   "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#isCreatorOf">
33   <owl:inverseOf rdf:resource="http://purl.org/dc/terms/creator" />
34   <rdfs:domain rdf:resource=
35     "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor" />
36   <rdfs:range rdf:resource=
37     "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Object" />
38 </owl:ObjectProperty>
```

마무리 : 메모장으로 파일 열어보기

```
59 <!--  
60 //////////////////////////////////////  
61 //  
62 // Data properties  
63 //  
64 //////////////////////////////////////  
65 -->  
66  
67  
68  
69  
70 <!-- http://purl.org/dc/terms/Title -->  
71  
72 <owl:DatatypeProperty rdf:about="http://purl.org/dc/terms/Title">  
73   <rdfs:domain rdf:resource="http://www.w3.org/2002/07/owl#Thing" />  
74   <rdfs:range rdf:resource="http://www.w3.org/2001/XMLSchema#string" />  
75 </owl:DatatypeProperty>  
76
```

마무리 : 메모장으로 파일 열어보기

```
79      <!--  
80      //////////////////////////////////////  
81      //  
82      // Classes  
83      //  
84      //////////////////////////////////////  
85      -->  
86  
87  
88  
89  
90      <!-- http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor -->  
91  
92      <owl:Class rdf:about=  
93      "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor">  
94      <rdfs:comment xml:lang="ko">행위자</rdfs:comment>  
95      </owl:Class>  
96  
97  
98      <!-- http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Group -->  
99  
100     <owl:Class rdf:about=  
101     "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Group">  
102     <rdfs:subClassOf rdf:resource=  
103     "http://dh.aks.ac.kr/ontologies/encyclopedicarchivesofkoreanculture#Actor">  
104     </owl:Class>
```


마무리 : 메모장으로 파일 열어보기

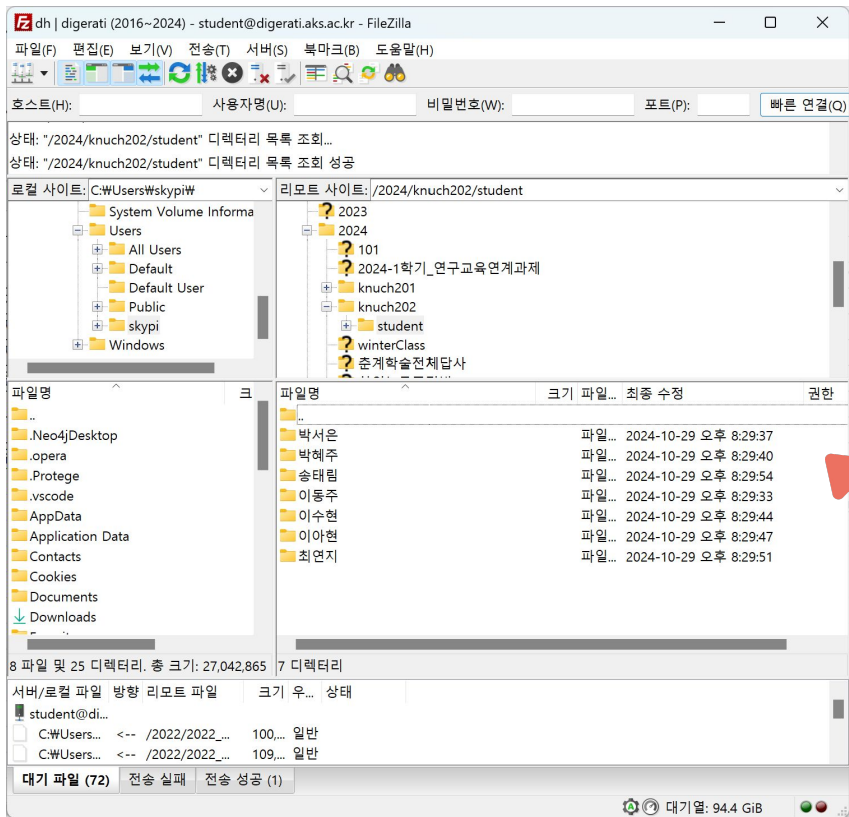
```
134
135 <!-- Generated by the OWL API (version 4.5.29.2024-05-13T12:11:03Z)
136 https://github.com/owlcs/owlapi -->
137
```



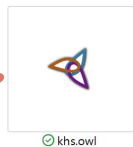
<!-- Generated by koreandressdhedu@gmail.com / 2024.10.30. -->

본인 연락처와 파일 작성 날짜로 수정

마무리 : 파일 업로드



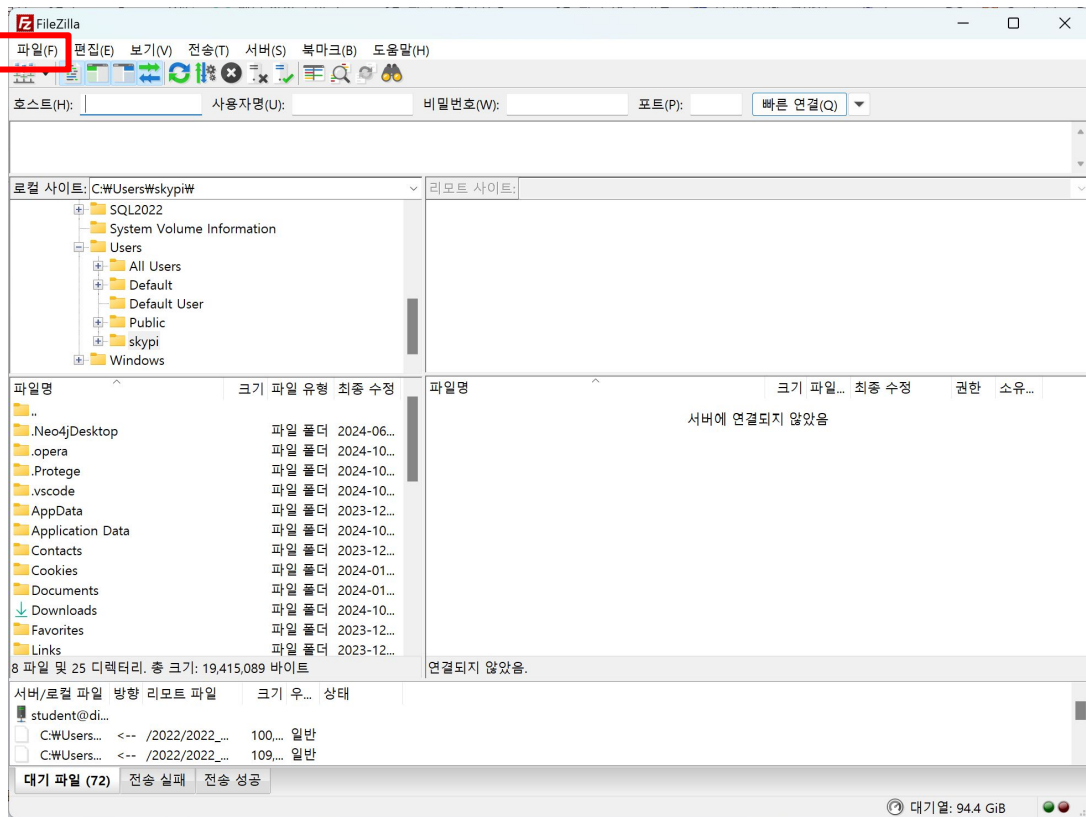
/2024/knuch202/student



각자 본인 폴더에
.owl 또는 .rdf
파일 업로드 완료하기

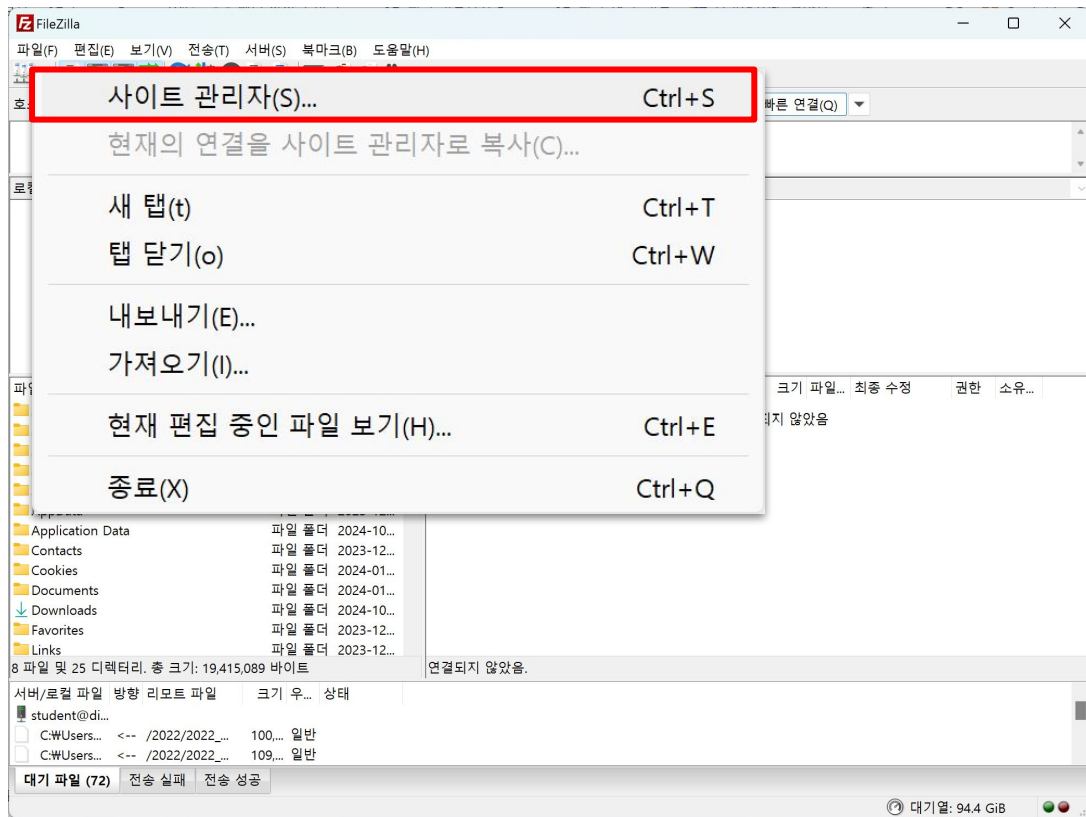
❌ FileZilla

파일 메뉴 클릭



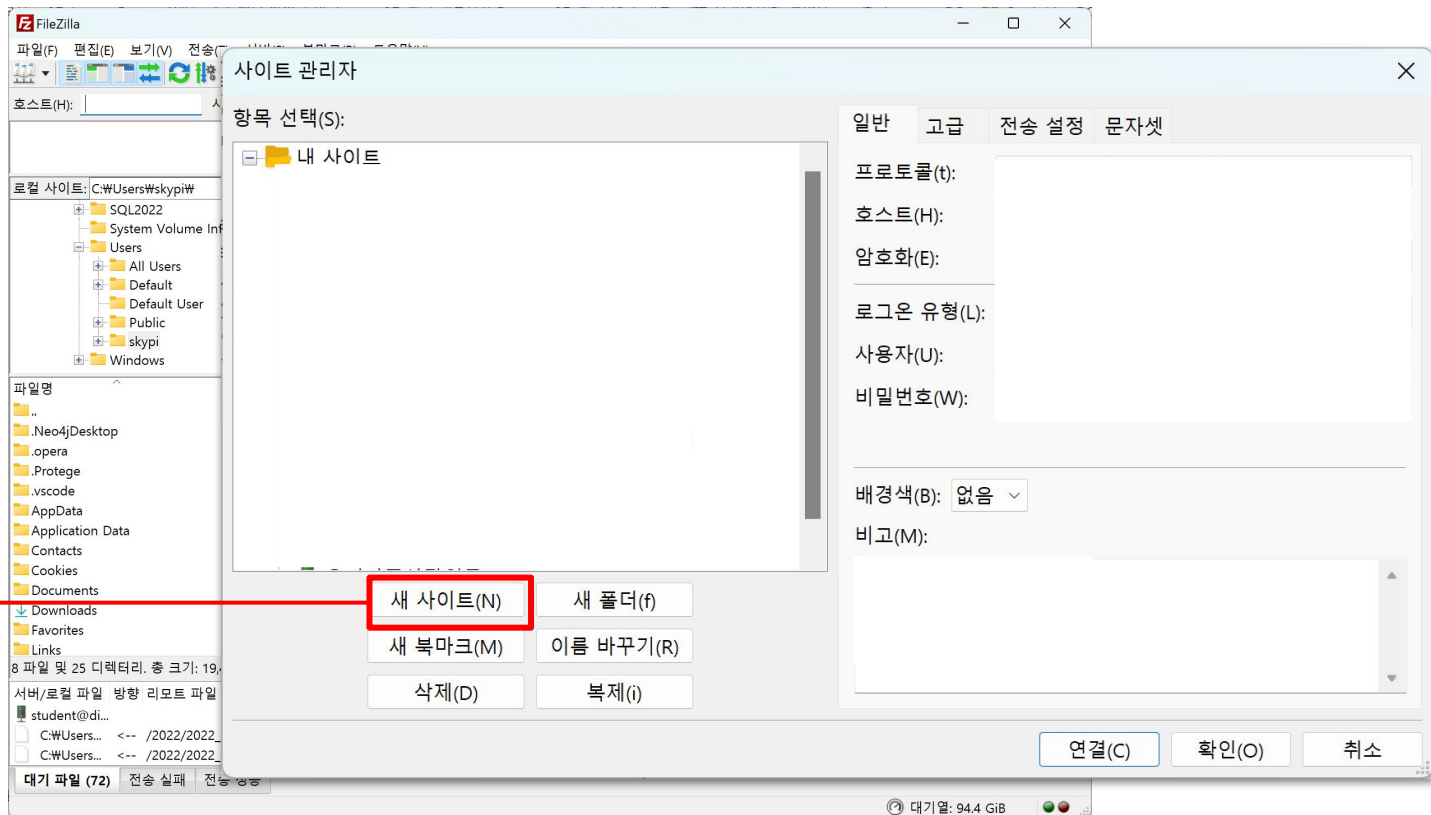
❌ FileZilla

사이트 관리자 클릭



❌ FileZilla

새 사이트 클릭



❌ FileZilla

① 새 사이트 이름
자유롭게 기재



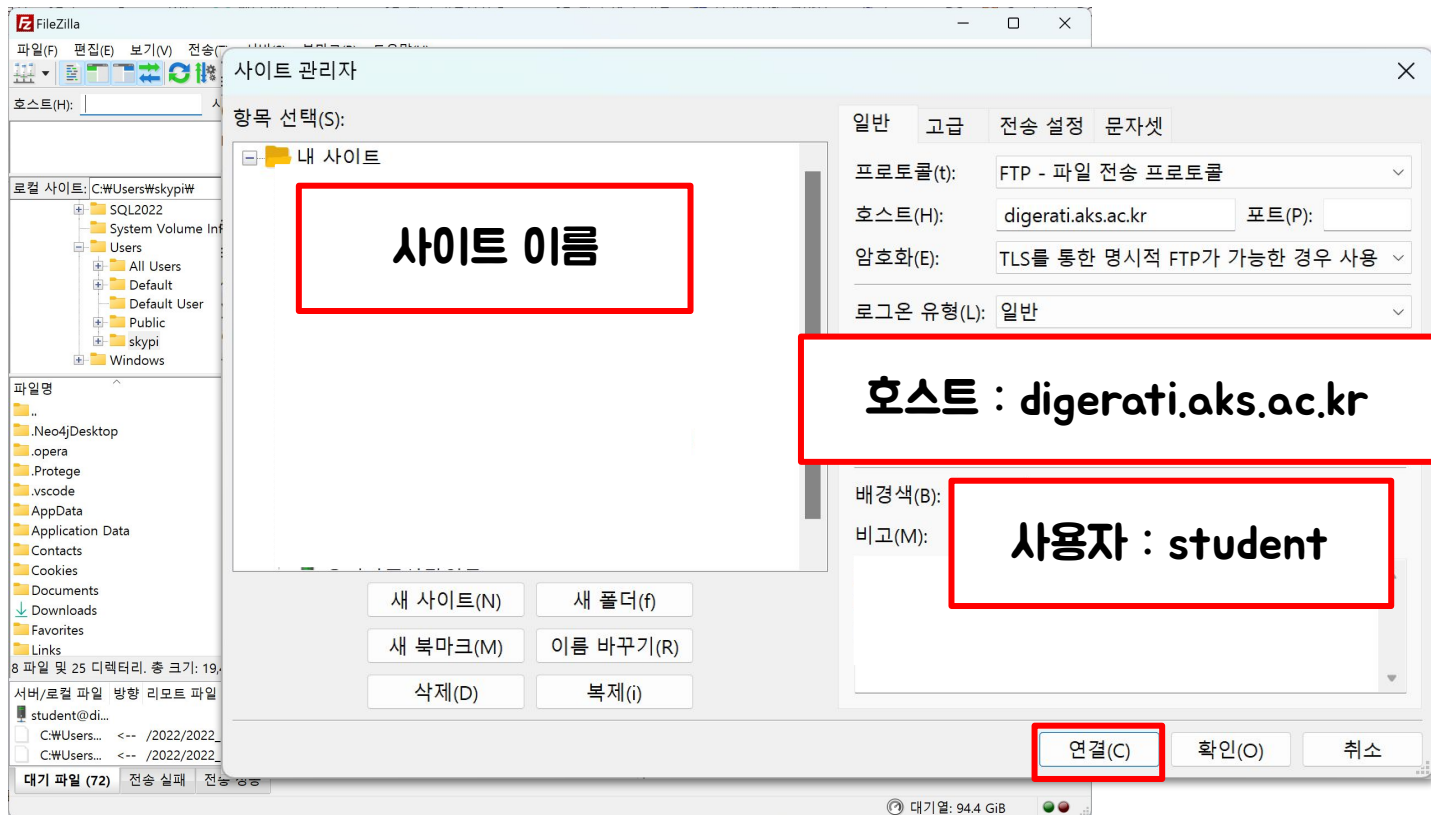
② 호스트 작성



③ 사용자 /
비밀번호 입력

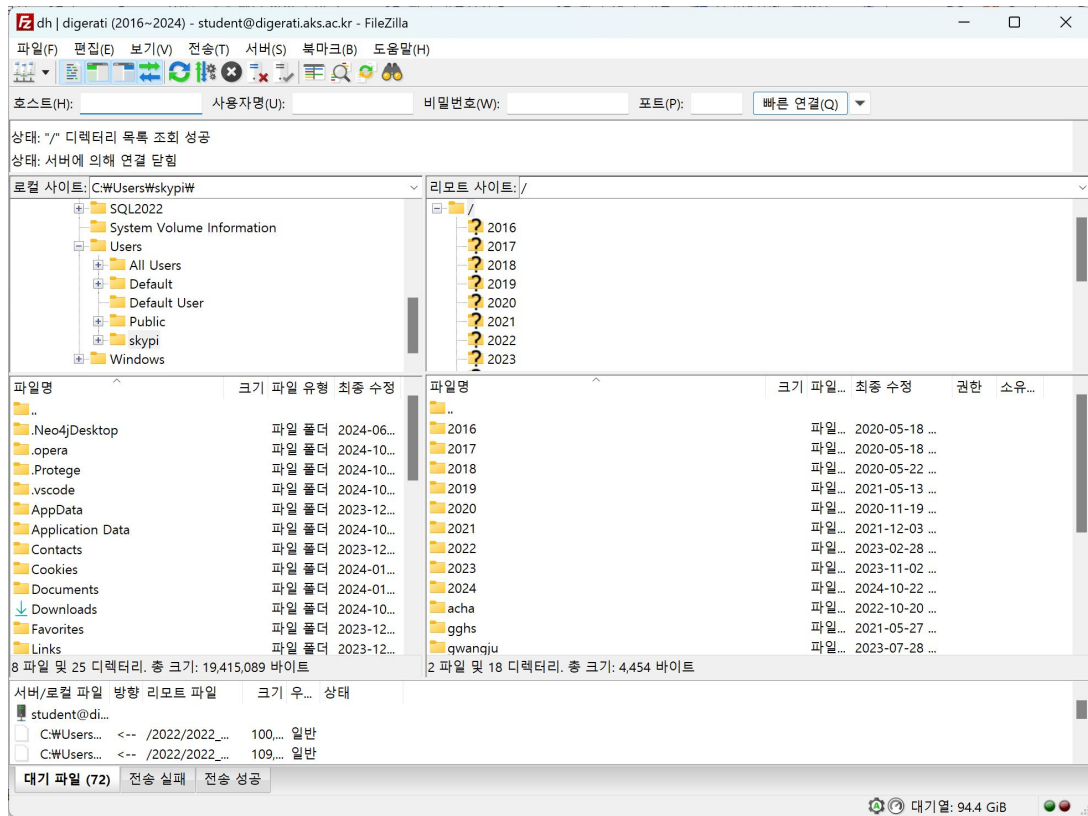


④ 연결 클릭

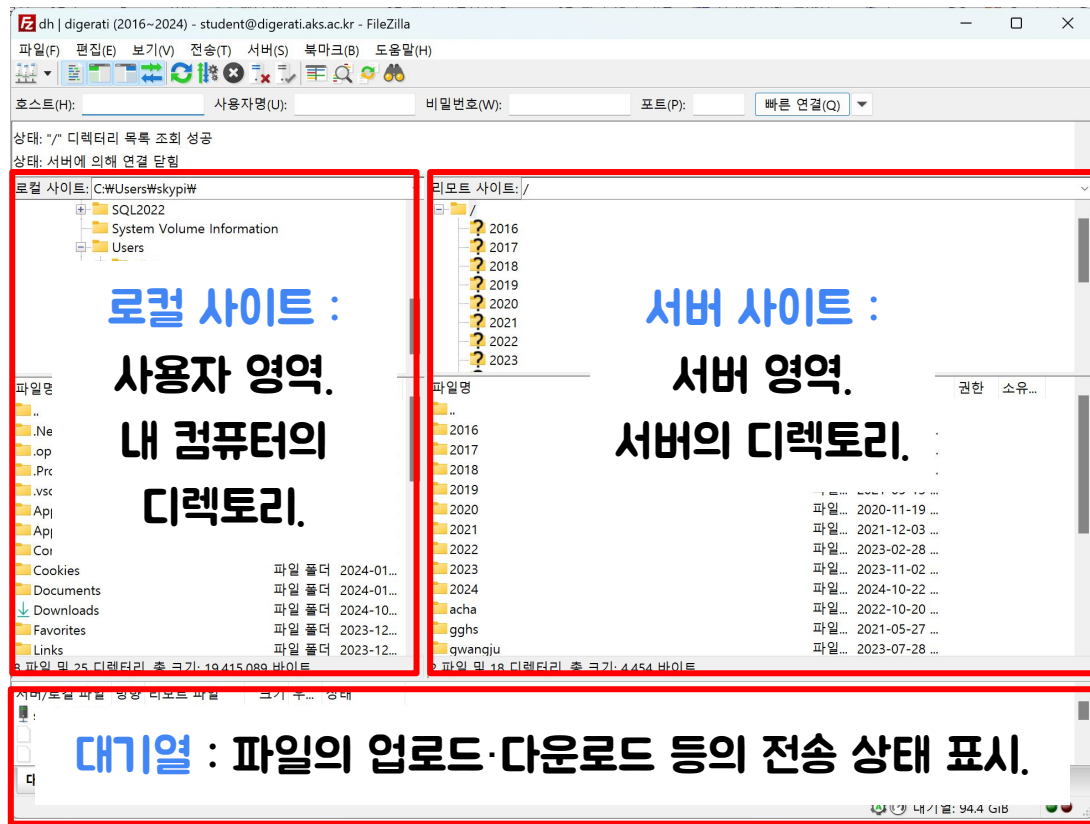


❌ FileZilla

연결 완료



❌ FileZilla





파일질라 사용법

<https://dh.aks.ac.kr/Edu/wiki/index.php/튜토리얼/ftp>